









# DOWNTIME

by Chad

## Swansea keeps its cool

A MAJOR disaster has been averted in South Wales, you will be pleased to hear. I read in the Daily Mail, which was reporting on the strike at the Swansea licensing centre, that "Maintenance men have cut off the computer's air conditioning, without which it could overheat and blow up."

I was most relieved to read that the computer had been switched off, allowing the good people of Swansea to breathe easily again. I had had visions of a most horrendous explosion, shattering the town with sprockets, skip chains, push-down stacks, and so forth.

## Bit of a letdown...

THE question I am most often asked by lay people awestruck by the jargon of our mystical profession, is "What is software?" Doubtless you have had the same experience. Well, you can now direct them to that most authoritative of sources, the Times, in which there was a

story recently under the headline: "Military software helps RFD to record."

The story is a bit puzzling to read, as one sees no mention of computers, but eventually it becomes clear what software its parachutes and rubber dinghies. So now you know.

## Increased word power

I WAS interested to note that in the Fabian pamphlet on The Computer and Society, so scathingly reviewed by my colleague Rory Johnston (CW, August 3), sinister implications are read into the arrangement between the AA and Readers Digest, which puts all AA members on the Readers Digest mailing list.

Junk mail from Readers Digest is unquestionably a nuisance, but I really could not see anything harmful in the magazine discovering the benefits of computer technology. Not, that is, until another

colleague pointed out that all the so-called off-beat items written about the computer industry inevitably land on my desk for processing.

Could I really, he asked, face with equanimity the prospect of having to read, every month, the latest of an unending stream of features entitled, "The most unforgettable computer I have ever known?"

I am heartbroken to have missed a guest editorial in the New York Times that I see mentioned in the paper's annual report. Admiral Elmo Zumwalt was writing about "The importance of Mickey Mouse".

## be prepared

our supervisor (Ms Valli Dater by name) was quite a card until she found the key to discovery one tea break while resting in the margins cool of the typing pool.

"My future," said she (Ms Valli Dater, the same) "lies with Mark" (O.C.R. Jar by nickname) for he, with his ECMA found B suave executive style, is where all Valli's tomorrows begin.

being quite a character in his own (read) right, dear old Mark lost no mill time in popping the question (/W/L U MRYME?)

Although our own single punched card days are numbered (1 to 807) and her vision of an OCR future was a wise decision, we will miss Ms Valli—the finest 80 col doll ever to graduate from our exclusive data Prep School.

malcolm poltu

In a long-awaited petition to the Federal Communications Commission, American Telephone and Telegraph formally asked the

government to approve in principle its establishment of an intelligent digital network called Advanced Communications Service. Here

HESH WIENER describes some of the benefits to users and the possible impact of such systems on the communications industry.

# Impact of AT&T system on the telecoms industry

THE full implications of such services as AT&T's proposed Advanced Communications Service (CW, July 27), have, perhaps, not been adequately appreciated by the potential users, the PTT authorities, or by equipment manufacturers. According to AT&T, the service, which would be offered on a nationwide basis, would allow terminals and computers to be connected with unprecedented ease.

Should the FCC approve the advent of ACS, a tariff schedule would be developed by AT&T by the middle of 1979. The network could go on the air shortly after the tariff is approved, using some existing Bell System components to serve initial customers.

The service would benefit a wide variety of users, and enable smaller organisations to develop communications-based applications that at present are not economically feasible because the initial costs are very high.

On the other hand, companies selling equipment which provides users with functions that will be available through ACS may suffer. IBM in particular, may have to rethink its approach to communications because the bit-orientated transmission scheme proposed by AT&T follows X25 guidelines rather than IBM's SDLC protocol.

"The ACS announcement must be very disturbing news for IBM," declared Charles Lecht, president of Advanced Computer Techniques Corp. "In the final analysis, IBM would have to view ACS as a Federally-sponsored alternative to the purchase of IBM equipment."

Indeed, sources close to IBM management said that there were long faces in Armonk when the news of ACS broke. IBM, which has invested heavily in the promotion of its own communications techniques and is deeply committed to Satellite

Business Systems, may be impacted in unforeseeable ways by the ACS announcement. User organisations may pause and reflect on the AT&T offering before they expand existing communications applications. This could slow orders for terminals, communications processors and related gear, regardless of the ultimate FCC decision on the AT&T service offering.

The system proposed by AT&T consists of local nodes scattered throughout the US, interconnected by high-speed digital links. The nodes, according to observers at the AT&T Press conference, would be initially built of computers made by Digital Equipment Corp.

specify a time of release for messages, which could have multiple addresses. Other facilities would allow data from various terminals to be pooled, and would permit individual messages to be built by combining sections of old messages with new material. Additionally, the address of a message could be woven into its text automatically.

In brief, the system would have features that satisfy the needs of interactive users, remote batch users, electronic mail users, users of digitised facsimile devices and users of high-speed telecommunications links.

In preparing its initial ACS and insurance claims processing. Three modes of message delivery would be incorporated in ACS: automatic, scheduled and demand. Automatic delivery provides routing, at the user's chosen speed and priority, between sender and receiver. Scheduled transmission provides the sender with an opportunity to specify when a message will be delivered, and demand delivery allows the receiver to tap a local storage pool and receive all messages stored therein.

The transmission schemes possible with ACS, such as character asynchronous transmission, asynchronous transmission in block mode, asynchronous transmission in polled mode, synchronous transmission in polled mode and synchronous transmission in bisynchronous mode. Additionally, host computers may engage in high-speed communications in bisynchronous mode or use the bit-orientated SDLC protocol. Emulation of terminal networks will be available for users with a commitment to existing terminal systems so that ACS would appear to their computers as an array of terminals attached to previously used communications processors.

Messages could be stored and forwarded as users might require. In addition, users would be able to define what AT&T calls "virtual subnetworks," clusters of terminals that are interconnected in specified ways to provide intercompany facilities, an alternative to present systems of leased lines and small communications processors or terminal clusters.

If the array of standard offerings is not to a user's liking, ACS will permit customers to develop their own communications programs and have these programs inserted into the node processors of the network. AT&T personnel will be available to help users meet such special needs, thus applications that fall outside the broad definition of ACS facilities may be implemented using whatever combination of network features the user might require.

Of the 3.6 million terminals and computers expected to be in use in the US by 1983, 137,000 would be attached to ACS, the company believes. This base is enough to make the service economically viable, according to the FCC filing.

Speculation has centred on the PDP-11/70 using AT&T's UNIX operating system as a node processor. ACS would allow users to connect terminals with a variety of codes, communication speeds and protocols. Similarly, computers using any of several communications techniques could be hooked up to ACS. The service would provide translation between disparate codes, data speeds and protocols. It would allow packets of information to move at different speeds through the network under different cost and priority arrangements.

But the ability to accommodate mixtures of terminals and computers from different vendors is only the beginning of the ACS facilities. Messages could be stored locally at the point of origination or gathered at the destination point. Users could

specifications. AT&T studied more than 2,000 applications of data communications in business, education and government. In addition, the company conducted detailed interviews with 65 major data communications users in 23 different industry segments. AT&T officials also reviewed reports prepared by various outside organisations.

AT&T has made some estimates of the number of users that would be on ACS initially. Of the 3.6 million terminals and computers expected to be in use in the US by 1983, 137,000 would be attached to ACS, the company believes. This base is enough to make the service economically viable, according to the FCC filing.

In addition, there may be ACS services provided to competing carriers. AT&T's statement specified that ACS would be capable of interconnection with other networks and carrier services.

Among the applications specified by AT&T that would be appropriate for ACS are order entry, freight control systems, medical information systems

and insurance claims processing. Three modes of message delivery would be incorporated in ACS: automatic, scheduled and demand. Automatic delivery provides routing, at the user's chosen speed and priority, between sender and receiver. Scheduled transmission provides the sender with an opportunity to specify when a message will be delivered, and demand delivery allows the receiver to tap a local storage pool and receive all messages stored therein.

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# IBM split into more manageable units

THE splitting by IBM of its data processing activities into two units (see front page), is generally seen as a move on IBM's behalf to break the company down into more manageable pieces, and to promote more "creative competition" between different parts of the company, as already exists between Data Processing and General Systems.

Commenting on the split, Gideon Gartner, computer industry analyst with New York stockbrokers Oppenheimer and Co, told Computer Weekly: "IBM does not want inter-

mediate systems to play second fiddle to large systems. "It goes back to the structure they had prior to the 360, when there were different groups for different computer architectures. They now have different architectures in the sense that they have a variety of operating systems."

"My guess is that the low-end operating system would be DOS/VS, with VS/1 and VS/2 at the high end, with VM/370 covering both." OS/VS2 version one is now better known as SVS, and OS/VS2 version two as MVS.

## Executives named

THE IBM split has been made in what was formerly called the System Products division. That name is retained for the lower end, and takes in the Endicott, New York, plant which is involved in manufacture of the 138, 148 and components, and also the development and manufacturing of the 3030 series.

A new Data Systems division includes four major New York plants. These are Poughkeepsie, where the 3030 series was lar-

gely developed and is manufactured; East Fishkill, responsible for logic and memories; Kingston, which tests machines from Poughkeepsie; and Brooklyn, responsible for printers.

The Data Systems division is headed by John Bertram, formerly vice-president of development and manufacturing of the old System Products division.

The new System Products division is headed by James Kuerner, who was an assistant group executive of the Data Processing Products group, into which both the new divisions fall.

## Ferranti moves into Glasgow

An expanded design and development capability is being planned by the Scottish division of Ferranti, and for the first time the company will be moving into the Glasgow area to house the expansion.

The company is taking a lease on a 20,000 square foot factory on the Bellfield industrial estate, and is planning to create about 180 new jobs for computer programmers, draughtsmen and

design and test engineers. The new staff will be working on inertial navigation.

Like most companies in the computer and electronics industries, Ferranti is labour limited, and this first move away from the Edinburgh area is hoped to open up a new source of labour. There is one other Ferranti factory in Glasgow, the Ceteq plant, which merged with Ferranti last year.

## Plessey moves into new era

INTEGRATED information handling systems is now Plessey's main field of business, says chairman Sir John Clark. He states in the company's annual report, that this is due to convergence of telephone exchanges technology with its other products such as military

radios, facsimile transmission. Profits declared in the report are £42.8 million, up from £40.3 million last year. This is on worldwide sales of £811 million, of which £120 million come from UK exports. Telecommunications accounts for 40 per cent of total sales.

## 'Pru' chooses MicroCobol

AN order for a MicroCobol system using IBM Series 1 hardware has been placed with CAP by the Prudential Assurance Company.

The online system, which will be the first in the financial sector to use CAP's

MicroCobol, will handle the accounting of reinsurance treaties.

The application will in addition use CAP's AutoClerk system, which provides portable routines for file maintenance and report generation.



## Do-it-yourself train times

Direct interaction with a computer is now available to travellers at King's Cross station in London, where an Extel Microfile computer system has been installed to provide train information. The traveller keys in a code number relating to one of 48 stations served from King's Cross and also indicates the day of travel and whether the journey is outward or return. The Microfile system then retrieves information such as times and details of trains from files stored on floppy discs and displays it on the screen in front of the traveller. The travel information is updated from a master terminal.

## German teaching Plan

LANGUAGE instruction by computer is being developed at the University of Hull, where students can get individual drilling in German grammar and vocabulary on an ICL 1901S.

Dr R. W. Last, a senior lecturer in the German Department, wrote the software entirely in Plan (1900 assembler), limited as he was by the amount of core available while the program was online. Exercises are entered into data files in a special code. They can work by question and answer or by multiple choice. Students get two attempts at each question; failed questions are recycled.

Answers to questions are short: usually one word plus a preceding article, so the software does not have to analyse syntax. Exercises in Dutch are to be introduced soon.

Dr Last says he finds the computer system better than a programmed learning textbook because it is "more interactive," and cheating is impossible. The students like it, he says, because it is private and they can go at their own pace.

# HAMILTON RENTALS

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
DIABLO 1620 H/term 1641	2450 2700	186 216	140 162 117 135

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
HEWLETT PACKARD TERMINALS			
2640B	196	147	123
2641A API/ASC.11	149	112	93
2645A	238	177	147
2648A Graphics	201	151	126
	316	237	197

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
LEAR SIEGLER			
ADMA 1A	890	72	54
ADMA 3A VDU	695	52	39

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
NEWBURY			
7001/2 VDU	595	52	39

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
TELETYPE 43	925	88	66

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TEXAS			
733 ASR	2250	180	135
742	3950	320	240
743 KSR	1105	88	66
745 Portable	1395	120	90
740.1	3895	320	240
810 Printer	1650	132	99

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
DIGITAL WORD PROCESSOR			
VS78 Dural Floppy	9975	620	475
VDU Printer			395
VS200 4 Floppy Discs	18250	795	695

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
DIGITAL MINI-COMPUTERS			
PDP 11V03	505	378	315
PDP 11V03C	1104	828	690
PDP 1103 DecLab	794	596	497

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
HEWLETT PACKARD DESK TOP COMPUTERS			
9845S	1160	870	725
9831A	415	311	259
9830	413	320	272
9825	339	269	217
9815A	213	160	131
9810A	339	271	226
9862A X-Y Plotter	221	162	135
9860B Printer	216	162	135
9871A Printer/Plotter	288	216	180
9872A X-Y Plotter	124	93	77
9877A External Taps Unit	68	51	43
9878A I/O Expander	221	165	139
9885M Flexible Disc Drive Master	308	231	193
7245A Printer/Plotter			

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
IBM PORTABLE COMPUTERS			
5100	528	484	382
5103 Printer	130	120	108

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
TEKTRONIX GRAPHIC COMPUTING SYSTEM			
4051	1354	285	221
4051 Hard Copy Unit	255	191	160
4662 X-Y Plotter	242	182	151
4956 Graphic Tablet	445	334	279

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
MICRO-PROCESSOR DEVELOPMENT SYSTEMS			
Motorola	490	368	306
Intel	573	407	339
Tektronix 8002			

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
DIGITAL TERMINALS			
LA30 Dural 11-20M/A	886	77	57
LA30 Dural 11-GPO	935	79	59
Interface	1069	86	64
VT52 Descoper - either 20M/A or VDU	189	159	118
LA120	1849	129	96
LA180 Serial	1699	129	96
LA180 Parallel			

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
ACOUSITIC COUPLER			
Transcrite 307	185	15	12
Marl. Tech. Mini-Modern	180	15	12

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
PLOTTERS			
Calcomp 830	380	285	238
Houston 830	202	151	126
Houston DP3	293	220	183
Hewlett Packard 7203	256	192	160
Hewlett Packard 7221A	245	184	154

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
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745 Portable	1395	120	90
740.1	3895	320	240
810 Printer	1650	132	99

Purchase Price	3 Month Hire	6 Month Hire	12 Month Hire
TEKTRONIX GRAPHIC DISPLAY TERMINALS			
4006-1	182	136	114
4010-1	294	221	184
4012	395	288	240
4013 ASCI I/A PL	415	311	259
4014-1	691	519	432
4015-1 ASCI I/A PL	754	565	471
4031 Hard Copy Unit	255	191	160
4662 X-Y Plotter	242	182	151
4956 Graphic Tablet	445	334	279
4024	186	140	117
4025	223	168	140

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# MICHIE'S PRIVATEVIEW

## Prophecies that weren't so far-out



SINCE early days, research workers in artificial intelligence have been accused of uttering wild-eyed prophecies which are then not fulfilled. The chief accusers have been physicist-politicians prominently for their own role as society's official miracle men. The chief loser has been the taxpayer, whose investment in timely and promising research has on occasion gone to the wall.

But has there not been some truth in the charge? Let us see. Enough time has by now flowed beneath the bridge for it to be possible to compare old prophecies with subsequent developments or non-developments.

As a start, I rummaged in an old article of mine entitled "Computer - servant or master". Published exactly 10 years ago, its first prophecy reads:

"I am fairly optimistic, if that is the right word, about the rate of progress in our own and other similar laboratories elsewhere, in Britain and abroad. I qualify the word 'optimistic' because many people view the objectives of such work with deep unease. If informed that by the late 1970s the first intelligent machines will be in our midst, their dominant feeling would not be one of optimism, but rather of gloom and anxiety. I shall leave to a later stage the discussion of whether there is justification for these fears - dehumanisation of life, mass redundancy among brainworkers, suffocation of man by surplus leisure, computer-aided snooping and 'thought-police'."

I find myself unrepentant of these words. Indeed in 1978 they have acquired a topical ring. We can of course quibble about just what was meant by "the first intelligent machines". But the same article's definitions would certainly apply to some of today's "expert systems" (see CW, January 5 and April 13).

A later passage speaks in highly specific terms of a question-answering facility which will one day become available as a service. Not only schools, hospitals and commercial firms but also the ordinary householder will be able to tap

information and problem-solving power from a national computing grid with the same ease and immediacy as that with which he now draws on central supplies of gas, water and electricity. Along with question-answering services, which will allow us to inquire about restaurants in our locality or politics in Paraguay, will come the games opponent, the puzzle-setter, and the quiz-master. An increasing demand upon computer systems will be for aid in coping in a stimulating way with the growing burden of leisure.

That was written in 1968, 10 years before vlewdata. Let us turn to some other forecasts.

In 1973 results were published of a Delphi survey using techniques employed by large corporations for technological forecasting, and by Chris Evans for a Computer Weekly study (CW, January 26). The essential findings of the 1973 forecast, made by AI scientists from Stanford Research Institute and Lockheed, in the US, are summarised in the accompanying table. Only five years have elapsed since then. Subsequent history has not as yet diverged from prediction. For live of the items the "median prototype date" was estimated for 1978 or earlier. Using the reference numbers from the table we can say the following.

P5. Convincing prototypes exist for computer identification of personnel by signature, voice and photographs. Details of the latter can be got from Leon Harmon, Department of Electrical Engineering, Case Western Reserve University, Cleveland, Ohio, USA.

P8. Working systems exist for congenital heart disease, thyroid enlargements, acute abdominal pain and internal medicine more generally, urinary infections and bacteriemia, and other clinical areas.

P13. "Industrial robot" as used here implies optical and tactile sensing in addition to programmable manipulation. Numerous such devices have now been demonstrated and commercial systems are under development, notably by Unimation Corp. in the US.

P1. Laboratory prototypes are capable of inferential question-answering in addi-

tion to ordinary database interrogation. P14. Prototype systems allow the customer to place orders by interactive terminal, with computer-generated price response. Commercial installations are expected considerably earlier than the Delphi estimate of 1983. But this becomes unrewarding. The noteworthy feature of such forecasts is not, as AI's critics allege, prediction of things which didn't happen, but rather the failure to predict things which did.

Nobody predicted the pattern of distributed intelligence now arising from the microprocessor revolution. Nor has any awareness been apparent of a new hazard from advancing hardware technology, namely inscrutability of ultra-powerful machine problem-solvers. I have already touched on this in a recent article (CW, October 27, 1977, January 19, and July 20), and will not return to it, except to re-affirm my belief that certificates of humanoid mentality should be demanded before critically responsible tasks are entrusted to machine systems.

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For a long time now motorists have had to have their vehicles certificated for roadworthiness. More recently society has extended its interest beyond the question of whether the vehicle functions reliably, to the question: "Does it also make an intolerable noise, or emit clouds of poisonous fumes?"

I foresee a time when any computing system on whose functioning large numbers of people depend will be refused certification if its strategies are hidden in clouds of impenetrable complexity.

As an elaboration of this thought, the next Privateview will venture a scenario for the "Cognitive City" of the year 2001 AD.

### REFERENCES

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### SUMMARY OF DELPHI RESULTS

Products	Median Prototype Date	Median Commercial Date
<b>High potential significance</b>		
P5 - Automatic identification system	1978	1980
P6 - Automatic diagnostician	1977	1982
P13 - Industrial robot	1977	1980
P1 - Automated inquiry system	1978	1985
P9 - Personal biological model	1980	1985
P11 - Computer-controlled artificial organs	1980	1990
P12 - Robot tutor	1983	1985
P16 - Intelligent economic model	1984	1990
P2 - Automated intelligence system	1986	1991
P20 - General factotum	2000	2010
<b>Medium potential significance</b>		
P14 - Voice response order-taker	1978	1983
P15 - In-flight weather analysis system	1980	1985
P3 - Talking typewriter	1988	1992
P4 - Mobile robot	1987	1995
P12 - Computer arbiter	1988	1995
P10 - Computer psychiatrist	1990	2000
P17 - Robot chauffeur	1992	2000
P21 - Creation and valuation system	1994	2003
<b>Low potential significance</b>		
P18 - Universal game player	1980	1985
P7 - Animal/machine symbiont	2000	2010

## SOFTWARE FILE-1

### Six-machine network can be extended to X25, says Prime

A NETWORKING capability has been developed by Prime which allows one Prime computer to be linked with up to four others locally, via interprocessor connection, and with up to two remote machines, via high speed synchronous communication links.

Called Primenet - and released with Revision 15 of the Primos operating system - the software is capable of being extended to conform to X25 protocols, according to Prime.

It is also intended that any Primenet network will be capable of linking with a packet switched network, such as Telenet or Tymnet.

Major features of Primenet include facilities for file sharing and file transfer, remote login, and sharing of peripherals. The system thus offers significant opportunities for the development of distributed processing applications.

With file sharing, standard file calls can be used to manipulate disc files anywhere within the network. Files may therefore be connected to any Prime computer in the network, in addition to the one logged in to.

Remote login similarly allows a terminal user to log into and interact with any computer in the network. This enables the user for example to make use of the extra processing power or memory space available on another system.

Primenet in addition enables users to share a number of I/O devices in the network. Printing, for example, can be done remotely or locally.

As an elaboration of this thought, the next Privateview will venture a scenario for the "Cognitive City" of the year 2001 AD.

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As an elaboration of this thought, the next Privateview will venture a scenario for the "Cognitive City" of the year 2001 AD.

For a long time now motorists have had to have their vehicles certificated for roadworthiness. More recently society has extended its interest beyond the question of whether the vehicle functions reliably, to the question: "Does it also make an intolerable noise, or emit clouds of poisonous fumes?"

I foresee a time when any computing system on whose functioning large numbers of people depend will be refused certification if its strategies are hidden in clouds of impenetrable complexity.

## SOFTWARE FILE-2

### EEC concern over use of firmware in minis

THE EEC is understood to be concerned that the growing use of firmware in minicomputers could have an adverse effect on the future potential for software portability.

At the same time, the increasing tendency to implement software functions in hardware has been highlighted by announcements from Interdata and the minicomputer division of Sperry Univac (see right).

The rapid pace of development in small systems architecture, including the growing tendency to incorporate specialised microprocessors, is cited as the major justification for an imminent EEC study in the area of portability.

The project, one of three for which the Commission has requested proposals (CW, August 10), is entitled "Study on the feasibility of developing a common software interface for minicomputers".

In the invitation to tender, the Commission specifies a number of tasks which the contractor must undertake.

In one task, contractors are called upon to analyse the possible use of microprocessors for implementing operating systems functions, and to assess the impact that this would have on the technical and economic feasibility of a standard software interface.

A previous task calls for the contractor to identify, in terms of I/O parameters and processing features, the basic common functions which would be accessed via such an interface.

Although the optimum level for implementing a standard interface is not pre-judged by the tender documents, specific functional modules mentioned include those for supervision,

monitoring, scheduling, processing, and organisation of memory.

A common interface to such functions from communications and applications software would facilitate portability of applications to other equipment, the document notes.

However, were operating system functions to be widely implemented in firmware, the technical and economic obstacles to establishing a standard interface could be greatly increased, it implies.

The Commission appears not to have ruled out the possibility of developing a standard common nucleus for minicomputer operating systems.

Constituting a portable operating system, such a product would be written in the proposed European Systems Language (ESL), the subject of one of the other studies (CW, August 10).

ESL is described in the official journal of the EEC as a prerequisite for the realisation of all the portable products envisaged, both in the operating system area and in the area of the third study, namely software conversion tools.

Its development, notes the Council of Ministers, must therefore be regarded as a matter of the utmost priority.

The EEC is particularly concerned about the compatibility and portability of software in distributed processing environments. Study of the possible common software interface is therefore to focus initially on telecommunication and data transmission applications.

According to the journal, a large number of manufacturers have expressed interest in the

possibility of developing an advanced level software interface.

The principal benefits expected are said to be longer life for software products, and the possibility of wider integration of products which might otherwise be incompatible.

Users would enjoy greater freedom of choice, and greater flexibility would be possible in the organisation of distributed processing systems.

The journal also notes that since software development costs are continuously and dramatically increasing, the general economic benefit of a standard would not be negligible.

However, it is acknowledged that the approach could have disadvantages, particularly for certain large companies selling complete problem solutions. Such companies see the specific nature of their products as a

protection of the market, it says, and, if the market is sufficiently large, an ad hoc solution may well prove more economical and efficient.

In all the studies, the EEC shows a keen interest in the commercial context of the proposals. Contractors are explicitly tasked with investigating the economic viability and acceptability of the proposed products.

An interesting aspect is that, if the portable products which result are commercially successful, the Commission intends to recover its costs in developing them.

"Funds given to industry for their realisation will be reimbursed to the Community according to a formula to be defined within the general context of the administration of projects and of the medium-term programme."

Computer Weekly is holding its third annual Charity Ball. Last year more than 600 people attended what has come to be regarded as the computer industry's big night out.

This year the Ball will again be held under the patronage of the British Computer Society, on the eve of the Society's 21st Birthday.

Proceeds will once more be devoted to a charitable cause within the computer industry. So why not help us to help others, and at the same time enjoy a pleasant evening with friends and colleagues.

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### Univac addition to Vortex ops system

A FIRMWARE accelerator for its Vortex-II multi-tasking operating system has been announced by Univac. Meanwhile, Interdata has released a micro-coded run-time assist package for Fortran VI programs on the model 8/32 Megamini.

Available only on the V77-000, the Univac package speeds the execution of the Vortex-II resident nucleus, giving a 20% to 40% increase in available CPU cycles, says the company.

The microcode requires 1,024 words of writable control store (WCS), and is provided free when the WCS hardware is purchased. The V77-000 can support up to 4096 words of WCS in total, which may also be used to implement the existing commercial and scientific firmware libraries, each taking 512 words, as well as user-written firmware.

Scheduled for release in the fourth quarter of the year, the accelerator is designed particularly to provide throughput

improvements in multiple terminal/multi-tasking environments characterised by a large interrupt-servicing overhead.

The company also announced conventional enhancements to the operating system which are available immediately. These include a multi-tasking output spooler, a tape labelling facility, simplified system generation procedures and debugging.

Interdata's Fortran Enhancement Package implements a variety of Fortran run-time routines in a new 2K WCS module. Transparent to user programs, the microcode is said to increase the execution speed of the routines by two to three times over assembly level implementation.

Routines implemented include single and double precision trigonometric functions, and real and double exponentiation.

The package, which costs £4,200, also provides 512 words of free memory.

# We're having a Ball!

## COMPUTER WEEKLY CHARITY BALL

### Friday October 13 at the Royal Lancaster

Computer Weekly is holding its third annual Charity Ball. Last year more than 600 people attended what has come to be regarded as the computer industry's big night out.

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## COMPUTER WEEKLY CHARITY BALL

### ORDER FORM

Tickets are available at £12 for a single ticket, (included in the price is a dinner, cabaret and dancing until 2 a.m.)

Please send me single tickets at £12 per head (enter number required)

Please reserve table(s) for me (10 places at £12 per head)

My cheque for £... is attached (cheques should be made payable to IPC Business Press)

When completed this order form should be returned together with your cheque to Chris Hipwell, Publishing Director, Dorset House, Stamford Street, London SE1 8LU.

Please send the tickets to me at the following address:

Name

Company

Address

### Puzzler

See page 45 for solution.

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

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### PROGRAMMER NOTES

THE idea of what constitutes a programming language is called into question by a contribution to the May 1978 edition of the British Computer Society's Computer Journal (Volume 21, Number 2).

The article, by W. N. Holmes of IBM Australia, poses the question: "Is APL a programming language?" It argues that programming should be distinguished from calculation, and that APL is suited to calculation but not to programming.

"Programming is problem solving, but not just any problem and not just any manner of solving," the typical modern program is an item of industrial manufacture, created by programmers exerting themselves

as members of a team for other people and their work must be done with these other people specifically in mind.

"Discussion of programming of methods of manufacture, both in respect of its management and in respect of its procedures. Most larger programs are developed by a team, and the overall design and building of the program, first in broad outline, then in ever greater detail."

"The closest thing to a program in APL is a collection of called subroutines, or a collection of subroutines which are not usually developed purposefully."

"In contrast, workspaces are usually developed from some crucial idea, which is expressed and checked out as a quite simple APL function. Alternatively, a group of related ideas is expressed as a collection of simple APL functions."

"In either case a bottom-up approach is used, contrasting with the top-down approach more suited to programming. This bottom-up approach is the essence of APL usage but should be anathema to programmers."

"The APL notation has properties which make it quite unsuitable for programming... the most significant being the qualitative of meaning, irrelevance of data representation and simplicity of sequence."

"Unlike well written programs, APL function definitions are not fodder for the interested public to browse, rather they are intensely personal and typically esoteric, even when written in style. All this is simply because the notation is concise."

"The major problem which APL faces is the well meaning misguided efforts to make a programming language out of it. If the APL notation were deliberately developed to make it more suitable for calculation, and programming languages were more deliberately developed to make them suitable for the industrial programming, the usefulness of computer machinery would be greatly enhanced."







## PEOPLE

### Prizes for three after systems course

TEN students gained NCC Certificates in Systems Analysis this year after completing the one-year part-time course at Watford College. In addition, three were awarded special prizes.

The award for the best all-rounder, donated by Baric Computing Services of Letchworth, went to Keith Delworth, who was working as a social scientist with the DoI's Fueling Research Station at Gatton while he was following the course, but who is now a market analyst with NCR. Baric is a subsidiary of ICL.

Our picture shows him receiving

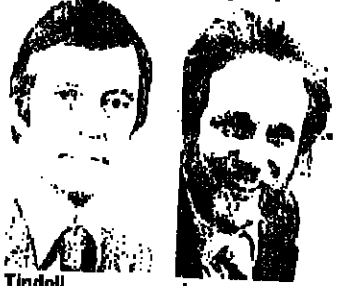
his award from Mr A. Baston, a member of the Management Studies Advisory Committee.

The local branch of the British Institute of Management made the award for progress in management development. This was won by Bernard Cohen, who took the systems analysis course as part of the complementary studies in the full-time course in Business which she was following at Watford. She is now employed as a DP manager.

The prize for software went to Peter Miller, a systems analyst at King and Hutchins. It was donated by F International.



Peter Tindall, previously a sales engineer with DES, has joined Applied Industrial Refrigeration Sales Ltd in the same capacity.



Alan Sizemore, David Chadwick, Ray Clarke and Cliff Teasdale have joined the Interdata division of Perkin-Elmer Data Systems as sales

executives. Sizemore, responsible for the West Midlands, was previously a sales executive with ICI Midlands. Chadwick, who takes the North-West of England and West Scotland, was a sales executive with Cybernet Timesharing.

The East Midlands area will be the responsibility of Ray Clarke, who was formerly a sales executive with Dataphysics, and Cliff Teasdale, who will be responsible for the North-East of England and East Scotland, was also a sales executive with Cybernet.

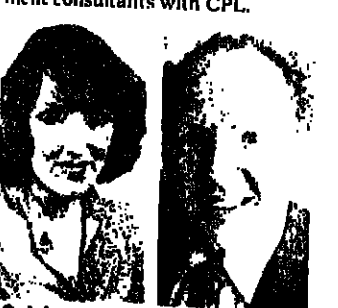
Formerly a systems programmer with ICI Organics, James Featherstone joins Perkin-Elmer as a regional support analyst for the North of England.

Jan Smith, formerly manager at Decca's radar service division, has become head of the reorganised field service division at Sintrom Electronics.

Michael Dudley has become director of leasing and broking with Ite International and will be responsible for the monitoring and promotion of leasing in Europe and the re-marketing of Ite's CPU portfolio. Previously he was sales manager of Ite UK.

David Harris-White and Pam Quinlan have joined the training division of BIS Applied Systems. Harris-White, who will initially specialise in database and real time courses, was previously database analyst with Parker Pen Co; Quinlan, who was most recently with Management and Executive Selection, where she specialised in recruiting computer lecturers, will lecture on BIS courses and organise one-day conferences.

Roger Evans of Computer People Limited, CPL, has been promoted from manager of consultant to general manager. Robin Shuter and Janet Chilvers have become recruitment consultants with CPL.



Quinlan Dudley Newman Atherton

### Soccer Summer Computer League results and tables

Following good wins over Datascano and Rank Xerox, Gryphon are now the leaders of Division I. However both Jadpu and SIA have games in hand and are still in contention.

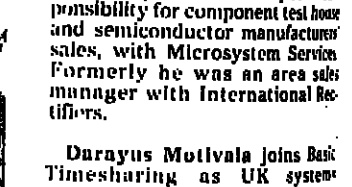
Results		Division II	
Division I		Division III	
Jadpu 4, Comshare 0		3M 4 2 0 12 8 6	
Rank Xerox 1, Gryphon 5		Datasolve (WE) 3 2 1 0 8 4 5	
Datascano 1, Gryphon 3		JPC Victor 4 1 1 2 21 12 3	
Division II		Gill & Duffus 1 0 0 4 2 3	
ICL 1, Altergo 3		Airfix 1 0 0 1 2 5 0	
Datasolve (City) 1, Atkins 4		Xerox 3 0 0 3 5 19 0	
John Lewis 0, Altergo 1		Division IV	
Altergo 3, Atkins 2		Division V	
Atkins 1, Datasolve (City) 0		Division VI	
Division III		Division VII	
Xerox (London) 1, 3M 2		Division VIII	
Division IV		Division IX	
Computer Weekly 0, C.J. Bees 2		Division X	
Bunzl US 2, C.J. Bees 0		Division XI	
USL 1, Wellorax 6		Division XII	
Division V		Division XIII	
CDC 0, Sherwood C.C. 2		Division XIV	
Hoskyns 3, Jadpu 'B' 3		Division XV	
Allen CS 5, CDC 5		Division XVI	
Tables		Division XVII	
Division I		Division XVIII	
Gryphon 6 5 0 1 20 6 11		Division XIX	
SIA 3 2 0 1 7 3 5		Division XX	
Jadpu 3 2 0 1 12 8 4		Division XXI	
Datascano 5 1 3 1 9 16 3		Division XXII	
Rank Xerox 4 0 3 1 8 18 1		Division XXIII	
Comshare 3 0 3 0 2 9 0		Division XXIV	

Bernard Atherton has been appointed divisional general manager of the management services department at Barclays Bank. Formerly he was assistant general manager of the department.

John Newman has joined Quin Automation as systems manager for Datascan. Most recently he was a military adviser in the computing, guided weapons and equipment division at the Royal Signals and Radar Establishment at Malvern.

Ian Harry has been appointed product specialist with special responsibility for component test house and semiconductor manufacturer sales, with Microsystem Services. Formerly he was an area sales manager with International Reliefs.

Darayus Motwala joins Bank Timesharing as UK systems manager, from Datascan where he was program manager.



Newman Atherton

## PERIPHERALS AND TERMINALS

# Programmer power a key component in editing CRT terminals

MOST articles about the planning, analysis, and design of computer/terminal data communications systems tend to focus on response time, transmission time, line contention, or queuing theories. While these areas are important, the system designer can often effect much greater savings in time and money when additional time is devoted to the selection of the communication system's primary I/O device — the terminal.

Recognising the significant impact of the human interface in any communications system, manufacturers of communications peripherals are devoting more time and effort to the human engineering and programmer control aspects of today's terminals.

The results of these efforts are operator and programmer-oriented products that achieve significant savings in time and money through improved operator productivity and reduced host computer loading.

By Doug Martin

Simultaneously with the improvements brought about by this commitment, manufacturers of terminals see prices of their products dropping and capabilities expanding with the increasing use of LSI technology and microprocessors. A good example of these changes is the editing CRT terminal as used for online database accessing and updating operations.

In the traditional interactive terminal environment, using an editing terminal can result in real savings, reduced operator fatigue, and optimal use of system resources. Proper selection and use of the best editing terminal's many features is the key to these improvements and savings. Some of these more important features and their uses are described here.

An editing terminal can eliminate the extensive compare operations that are usually required to update operations. This helps to minimise the loading imposed on the host computer. The necessary feature is a modified data tag for transmission to the host only those fields whose contents have been changed by the operator. This saves host time otherwise required to receive a full 1820 character screen and compare it with the screen image originally sent down to the terminal.

Another feature is the protected field which enables the programmer to specify which data cannot be changed by the operator. This allows information which is needed for several successive operations, such as column headings and graphic

representations of forms, to be written down once only, again saving operator time, communications line loading and host loading.

Since the terminal operator is the weakest link in the communications network, as far as errors are concerned, complete control of what happens on the screen is very important to ensure accuracy. If the programmer knows what is happening at the screen at all times, he can lead the operator by the hand and so reduce the errors.

Where the operator transmits one or more lines of data instead of the entire screen, the ability to read the cursor location, and then move it vertically or horizontally to the correct line and column, enables the programmer to position the cursor to the next point where operator action is required. This saves operator time. When protected fields cannot be used for some reason, this positioning prevents costly mistakes.

A simple feature such as being able to set tab stops at any position of a line allows the programmer greater latitude in programming than do the fixed tabs common on many editing terminals.

Providing the programmer with complete terminal status information, such as parity error, printer error/busy, keyboard locked and keyboard mode control switch settings, prevents needless errors, software upsets and service calls. Complete access to full terminal status information provides the programmer with more control over the screen. It allows simple error messages, such as "printer not ready", to be displayed for the operator, avoiding delays which may otherwise be encountered in these situations.

Graphic capability enables the programmer to portray familiar forms on the screen. This tool makes the operator's job easier and helps reduce errors, especially by new operators.

Defining graphics as "protected" fields, in combination with a "clear-unprotected only" feature, assures retention of the graphic form for re-use, without requiring it to be sent down from the host again.

Graphics also break the visual monotony of the screen and allow the programmer to highlight fields of particular interest by use of the CRT's blinking, brightness and inverse video features.

The disparity between software and hardware development costs continues to widen. An extremely useful tool for debugging new software systems is the transparent mode, which enables the programmer quickly to recognise the causes of problems during program development. In the transparent mode, all characters including control characters are displayed, and the programmer easily verifies exactly what was transmitted to the terminal.

Some editing terminals have function keys. The programmer assigns various meanings to the unique ASCII codes which the terminal transmits when these keys are depressed. Based upon the transmitted function codes,

the programmer causes specific programs to be loaded and executed.

With function keys, it takes only a single key depression to call a complex function — a significant saving in time and accuracy compared with entering multiple character messages to call the function by name.

Whatever the programmer

Turn to page 12

The low-cost 1200 Video Display Unit is a high-quality editing terminal with line drawing capabilities. It has been designed to ensure low operator fatigue and high throughput.



The scope and power of peripherals and terminals for computer systems are continually being improved. As new applications are developed, equipment is designed or adapted to provide the necessary facilities. In this special section three aspects of this market are discussed. Mike Kitching of Memorex looks at the role of the PCMs; John Macdonald of Honeywell explains the benefits of high speed printing techniques; and in this first article Doug Martin, sales manager, Europe, of Perkin Elmer Data Systems Terminals Division, shows how the design of communications systems can be enhanced by the use of the sophisticated terminals that are now available.

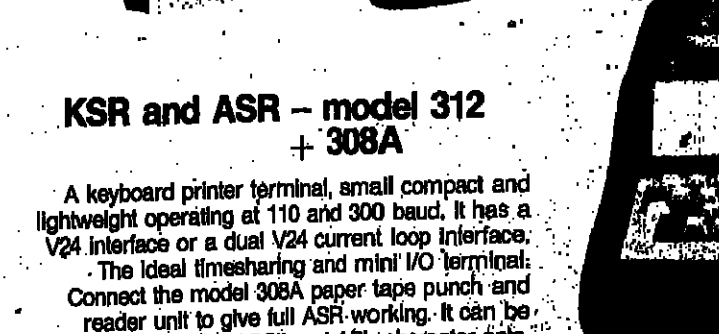
## Transdata's Terminal Entrée



**Portable — model 305**

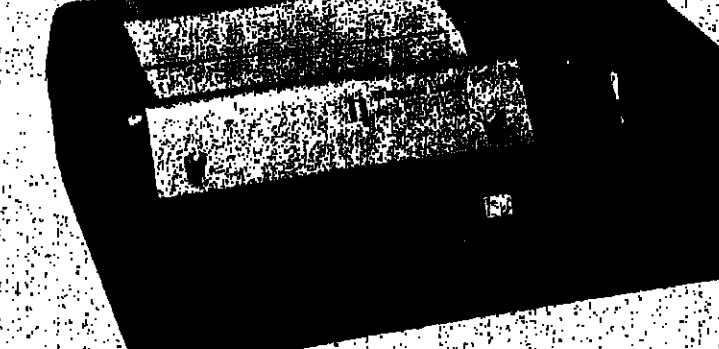
It operates anywhere, all you need is a telephone with a computer at the other end. Its fast reliable electronic printing technique is silent and requires no ribbons or costly maintenance. Its lightweight makes it easy to carry around and the tough case enables it to endure the knocks and bumps of travel arriving working as usual.

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**R.O. — model 313**

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## COURSES

THE University of Salford is offering several short courses on subjects in the computing field this year. They include courses on microprocessors, microcomputers and their applications; a first course in Cobol training; and computer programming using Basic for teachers and lecturers. For details apply to the Administrative Assistant (Short Course), The University of Salford, Salford, M6 4WT. Tel: 061-76 5943.

NUMERICAL COMPUTATION is the subject of a one-year Open University course for which no qualifications are required but a knowledge of calculus and matrix theory is necessary. Teaching is carried out through correspondence texts and TV and radio programmes. The application period is open until mid-October. For further details contact the Associate Student Central Office, The Open University, P.O. Box 76, Walton Hall, Milton Keynes MK7 9AN.

AN intensive course for designers and engineering managers on the design of microprocessor-based systems has been organised by Prodec and will be held in mid-November in Bristol, and then successively in London, Manchester and Birmingham. For details contact Prodec (Seminars) Ltd, 79 High Street, Tunbridge Wells, Kent TN11 1XZ, tel: Tunbridge Wells (0882) 39664.

USING small computers in engineering. Choosing a microprocessor, and understanding its use in electrical engineering are the titles of three courses and scheduled for September 18-19, October 28-29 and December 12-14 respectively. All will take place in South Devon. For details contact Courses Dept, Computational Mechanics Ltd, 6 Cranbury Place, Southampton SO2 0LG. Tel: (0703) 21307.

THREE courses in computer-aided circuit design are offered by the Department of Electrical Engineering at Imperial College, London this autumn term. They are: Sensitivity analysis (September 11), Numerical methods (December 1-2). Further information may be obtained from Joan Jeffery, tel: 01-859 8111, ext 1470.

AUGUST 31-31 Operational data security workshop. Operational data security. Corp. Office, 118 St. James St., London, W1P 0JL. Tel: 01-492 3366.

AUGUST 31-31 Cybernetics and systems fourth international congress. World Organization of General Systems and Cybernetics. Amsterdam. Details Dr J. R. van der Kamp, Department of Cybernetics, University of Amsterdam, P.O. Box 915, 1000 AB Amsterdam, The Netherlands. Tel: 020 6331.

CONFERENCE on parallel processing. IEEE Computer Society/Wayne State University, Detroit, Michigan, USA. August 23-24. Tel: 0313 487 1111.

AUGUST 23-23 Meeting of the UK and Ireland Users Group. Manchester. Details from Ian Smith, 01-492 3366, ext 2706.

AUGUST 23-23 SIGGRAPH '83 (first conference on computer graphics and interactive techniques). Association for Computer Graphics, Atlanta, Georgia, USA. August 23-23. Tel: 0404 521 4400, ext 2127.

AUGUST 23-23 Jackson design techniques. Management of Computer Systems, University of Strathclyde, Glasgow, Scotland. Details from the Computing Services Office, University of Strathclyde, Glasgow, Scotland. Tel: 041 552 4400, ext 2127.

SEPTEMBER 4-4 Medical Informatics Europe congress. European Association for Medical Computing, Cambridge. Tel: 0223 311111.

SEPTEMBER 4-4 Comshare Fall 78. IEEE Computer Society, Washington, DC.

SEPTEMBER 4-4 People in computing seminar. National Computing Centre, Rutherford Campus, Harwell, Oxfordshire, UK. Tel: 0491 571111.

SEPTEMBER 11-11 Non-invasive cardiovascular measurement conference. NASA/San Jose State University, San Jose, California.

SEPTEMBER 12-12 Computer program for project control. International Association of Project Managers, London. Tel: 01-225 2011.

SEPTEMBER 12-12 Computers and the future. Clive Jenkins, ICL 1978 Lecture Series. London School of Economics, London WC2. Tel: 01-459 1111.

SEPTEMBER 12-12 How do we use it? — how to monitor and control the day to day running of the New York Stock Exchange. Royal Angus Hotel, London. Tel: 01-459 1111.

SEPTEMBER 15-15 Very Large Databases conference. IEEE Computer Society/ACM/SIMS, Berlin.

SEPTEMBER 15-15 Jackson design techniques workshop. Marcus Bromberger, Dept. of Computer Science, University of Strathclyde, Glasgow G3 7JL. Tel: 041 552 4400, ext 2127.

SEPTEMBER 15-15 Getting cost control accepted seminar. Association of Project Managers, London. Tel: 01-225 2011.

SEPTEMBER 15-15 CAI/CAH computer-aided design and manufacturing conference and exhibition. Computer and Automated Systems Association, Los Angeles.

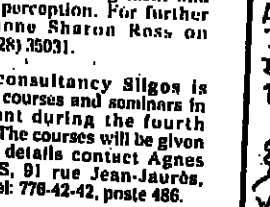
SEPTEMBER 20-20 VME/V group meeting. 3000 User Group, National Liberal Club, London SW1. Tel: 01-459 1111.

SEPTEMBER 21-21 Symposium on interactive techniques in computer-aided design. IEEE Computer Society, Bologna, Italy.

SEPTEMBER 22-22 International computer communications conference. ICC-78. International Council for Computer Communication, Kyoto, Japan.

## Cinequatre Saga

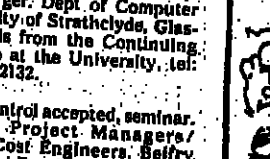
APART FROM THE OLD BALLOONIST, DID YOU BEING ANYTHING ELSE FROM THE 1910-1920'S?



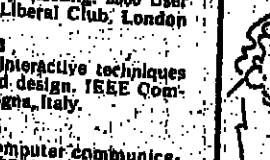
YOU MEAN VINLAND? NO, I SOUGHT EL SOMBO IN SILICON VALLEY...



...AND FOUND ONLY THIS PILE OF STONE CHIPS!



AT LAST! THE MOST SECRET OF THE ATLAS!





# PCMs fulfil a real need in the industry

By Mike Kitching

THE nature of the question, "Why PCM?" is now nearly academic. Most computer users have been exposed to the many arguments for and against, and the growth of installations with sizeable proportions. The industry, however, is a long way from a true revolution and mainframe manufacturers still largely dominate the direction and philosophy of data processing, although PCMs have had an important effect on product technology, contractual and pricing practices.

It must also be said that the bulk of PCMs have concentrated on the IBM installed base, by far

the most lucrative and wide market segment in the industry. Users who have not carefully considered the possibility of utilising plug-compatible peripherals may benefit from a review of PCM development and the salient elements contributing to their growing acceptance.

The introduction of System 350 heralded the principle of compatibility, including upward compatibility of application programs, a standard method of operation under a microprogrammed operating system, and data compatibility through a standard peripheral equipment interface within the operating

system. Most of these concepts, incidentally, were developed and demonstrated by other manufacturers some years earlier.

With compatibility the PCM industry also began. Through a combination of technological improvements and keener prices, a combination which still holds today, users were for the first time offered an alternative to the total system package offered by mainframe makers. PCMs forced the introduction of single capstan tape drives and "voice-coil" motor-operated disc drives, developments which were being held back largely for marketing considerations such

as product life, product differentiation and pricing.

The threat posed by the PCMs was countered and is still being countered with shifts in technology, changes in interfaces, pricing policies aimed at competing with PCMs, and veiled and overt suggestions that the introduction of foreign peripherals would bring about dire consequences — withdrawal of system responsibility and system support, system failure, contractual invalidations, incompatibility, etc.

Today PCMs are active in every peripheral area including media products, and the mixed vendor environment is widely

accepted. Memorex in the UK, for example, are present in over 50% of the IBM installations in their area of operation. Early fears about reliability, field engineering support and compatibility have vanished.

PCMs, furthermore, continue to offer higher performance characteristics, faster delivery and a generally more flexible approach to user needs, including contractual terms. Their knowledge and application to total systems requirements goes well beyond the mere sphere of plug-to-plug replacements. System 360 users, typically, were able to extend their CPUs' life expectancy through advances introduced by PCMs.

The immediate future will probably consist of activities of the same type, with plug-compatibility, higher performance and lower cost. However, with the increasing strength of PCMs, products will be introduced which will be more than simply functional replacements.

For example, non-IBM communications controllers are now available that perform some of the functions of TCAM, but still interface to an IBM 370 in a normal manner. In the near future, we can expect high-speed, solid-state memories operating on buffers between disc storage and the main memory, with capacities in the 100 Megabyte range.

Why, then, PCMs? Essentially, because they fulfil a need in the data processing industry which no one else has attempted to address. They have entered the market-place with the twin spearheads of innovation and lower prices. The trail-blazers who accepted their wares were instrumental in giving impetus to a trend which has since benefited the industry in general, with the end-users gaining the advantage of technology



PCMs have started a trend which has had an overall beneficial effect on the industry, and DP managers have gained a degree of independence from mainframe manufacturers which they have welcomed above all else, says Mike Kitching, who was appointed managing director of Memorex UK following the merger with Telex UK at the beginning of the year. He had been managing director of the latter since April, 1976. Kitching was previously marketing director of ITT Data Systems.

at a more reasonable cost.

PCMs were also responsible for the changes which mainframe manufacturers were compelled to bring about in the way systems are sold or leased. The veneer of mystique associated with computer systems purchase has mainly disappeared and users now have a choice — an extremely valuable asset when dealing with the monoliths of the industry.

PCMs, therefore, may be said to have started a trend which has had an overall beneficial effect. Great causes, however, are not the stuff of commerce; commercial success is measured in sales. DP managers who opted for plug-compatible machines did so on a purely economic and operational basis, and will continue to do so only as long as PCMs can demonstrate value for money.

In the process, DP managers have gained a degree of independence from mainframe manufacturers which they have welcomed above all else. This independence — this alternative — is now the keyword to the marketing approach of the alternative suppliers.

The DP manager knows that the mainframe and PCM supplier have learnt to live together safely in his computer room.

## Programmer power

• From page 11

does to make the terminal operator's job easier reduces the chance of errors creeping in. Some editing terminals not only allow the programmer to define numeric-only fields, but also allow the keyboard to lock if that format is violated.

Since groups of data which are meaningful in the application sense probably do not correspond exactly with one or more lines on the CRT screen, more efficient use can be made of the screen's limited capacity through the message approach. Some editing terminals may be used either conversationally, or in block mode, again adding to the range of applications they can support and help out in debugging.

Other useful transmission types include the ability to send everything, to send just those fields containing modified data, or to send just unprotected data.

The Request-To-Send mode is a big help to the system designer who wants to make optimum use of the host main memory. In this mode the terminal sends a three-character code to the host

when any send key is depressed. This informs the program that data is ready for transmission and specifies which send key (or function key) has been used by the operator. After identifying the depressed send key, the program allocates the necessary storage and issues a "read" code to initiate transmission of the data.

The Request-To-Send mode can be used with any of the transmission types. In addition, as part of the "read," the host is free to ignore the operator's choice of send key and read everything, modified data only, or protected data only, by page or by message.

In this mode of operation, the host is in control, not the terminal operator. The host need not read a terminal until it is convenient to do so, and until it has available a buffer for the transmission. The buffer can be much smaller than a full page if the send line or send message capabilities are used. These main memory and time savings are especially important to the growing number of minds and even microprocessors finding their way into small multi-terminal online systems.

# Choice of high-speed printing technologies

By John Macdonald

WHAT is meant by high-speed printing, a term so far unfamiliar in many British computer installations? Essentially it is printing with non-impact output devices at rates in excess of about 8,000 lines a minute.

To do this requires a complete break with the impact printing techniques found in the typical line printer, which has a top speed of not much more than 2,000 lines a minute.

The quantum leap through to these new high speeds, which can reach up to 18,000 lines per minute and will rise higher, involves a switch in technologies. But which technologies?

Honeywell Information Systems believes the future lies with electrographic processes. Companies like IBM and Xerox disagree. They have plunged for electrophotographic techniques.

The companies which prove to have taken the wrong route will have the difficult task of catching up in an unfamiliar technology.

The argument between the two types of system falls into three main areas — cost, technology and future development. And the fundamental differences in each of the electrographic and electrophotographic techniques give users a choice of following very different routes.

The basic technological difference is that manufacturers of electrographic equipment have chosen to share the technology of the process between the equipment and ordinary-size dielectric paper, whereas electrophotographic equipment extends the familiar photocopying techniques into HSP (High-Speed Printing) using traditional computer print-out paper.

The differences in the technologies can best be illustrated by describing two typical systems. Take first an electrophotographic system producing its output on computer print-out paper.

Although this is an extension of photocopying technology, how do you digitise a photocopying process? The answer is by using a laser beam. A photoconductive drum is initially charged evenly over its entire surface. A xenon flash strobe projects an instantaneous image of the film negative of the required form onto the photoconductive drum. The high intensity light has the effect of imprinting an electrostatic image on the surface of the drum.

Variable data is then superimposed on the forms image by the laser beam. This is reflected from a rotating multifaceted mirror and forms a pinpoint of light on the drum, the pinpoint being scanned across the drum surface by the rotation of the mirror. Each facet of the mirror represents one scan.

The laser beam is interrupted electronically, thus giving a modulated scan of light onto the photoconductive surface in a manner similar to that of an electron beam scanning the surface of a video screen.

Dryink toner is applied to the drum surface at a further position in the machine to develop an image before the image is applied to the plain paper. It is a fairly complex piece of electro-mechanical technology.

An electrographic system will work in a completely different way. To begin with, the paper passes right through the equipment on a roll, and at various stages the printing takes place.

The first stage the paper passes is a forms cylinder where forms are created, thus eliminating the need for pre-printed stationery in most applications.

The latent forms image, which cannot be seen yet, then passes across the print head where the variable print data from the computer output is added by electrode stylus which produce a dot matrix of 200 dots to the inch horizontally and vertically. This means that a wide variety of print styles and sizes can be produced.

The paper then passes through the toner station where liquid ink is applied to a roller. The charged ink particles adhere to the oppositely charged areas of the paper and develop an image. The paper is then dried, and passes on through perforating, punching and stacking processes.

The secret of the success of this method is, of course, the special dielectric paper. Strides in paper technology during the last few years have made this a more viable proposition.

But it still upsets the cost element of the choice, and provides potential users with something of a dilemma. It could be said that for users the basic argument revolves around the cost rather than the technology.

Whereas the capital cost of electrophotographic printing systems is significantly higher than that of electrographic systems, paper for, and therefore running costs of, electrographic systems are higher.

For instance, typically, Honeywell would charge around £150,000 for a medium capacity configuration in its range of Page Printing Systems, and reckons that equivalent electrophotographic equipment would cost about £230,000.

However, paper costs on the PPS are at the moment higher. They have been as much as 70% higher than plain paper costs on electrophotographic machines. The practical effect of that was that once a user hit the two million pages a year mark on his machine, the cost advantage of the equipment was wiped out in running costs.

Changes in paper costs are, however, altering that vital equation. While the cost of plain paper for electrophotographic machines is likely to double in the next two or three years, dielectric paper will rise at a much more sedate rate, which could reduce the differential between the two to as little as 15%.

This could still create higher running costs on electrographic machines at the highest throughput levels, but it changes the arithmetic in electrographic's favour lower down the scale and, as the difference in paper cost narrows, so the electrographic technique will become economic even at the higher throughput levels.

However, the running battle between the technologies is likely to develop some interesting twists during the next two or three years. Because there are two different technologies, attempts by rival manufacturers to improve the performance of their machines will involve radically different approaches.

This, in turn, could affect the capital cost of the rival equipment to varying degrees, again changing the sums which users will have to do.

Take just one development

which is already being forecast — double-sided printing. With electrographic equipment the task of introducing this is comparatively straightforward because much of the technology is in the paper. Essentially, double-sided coated paper has to be introduced — there are certain problems about this which are currently being solved — and fairly simple changes made to the drums and dot matrices in the machine.

With electrophotographic equipment, because plain paper is being used, the printing mechanism within the equip-

ment will need to be duplicated. So users have to make a carefully judged decision, particularly if they are looking ahead. But there is little doubt that high-speed printing systems will be a major growth area of the 1980s.

And users will have to learn to look outside the traditional data processing budget for the kind of cash savings they can produce. For instance, the ability to sort output automatically by postcode as part of the printing operation means that savings can be achieved in bulk postage rates.

Other savings are made by computerising jobs which previously would not be computerised because the quality of the print was inadequate, for instance, direct mail shots.

The fact that the end-product from the electrographic technique can be an A4 size printed page rather than the traditional unwieldy print-out paper would mean greater savings and convenience in storage and filing.

Finally, there are major savings in the operational costs of post and printing activities.



Honeywell Information Systems believes that the future of high speed printing lies with electrographic processes. Other companies like IBM and Xerox disagree, and have plunged for electrophotographic techniques. John Macdonald, PPS director of marketing at Honeywell Information Systems, says that the companies which prove to have taken the wrong route will have the difficult task of catching up in an unfamiliar technology.

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# DPMs in the US reach for the top

THE growing importance of computers to the running of a business has led to a significant increase in the status and salaries of DP managers in the US, with some DPMs commanding salaries of up to \$135,000.

A recent survey in the UK by BIS Applied Systems showed that UK DP managers were being hit by successive pay restraint policies which have eroded differentials between management and their senior staff (CW, June 1).

According to the Wall Street Journal, however, the salary gap in the US between DP managers and their staff is increasing, partly as a reflection of the increased status of DP management within the corporate structure.

While salaries for most DP staff have risen by about 4.5% annually since 1971, those at the top of the DP ladder have been increasing at an annual rate of 7.5% with the average salary of a DP manager rising from \$23,765 to \$36,606 in the seven years.

But the Wall Street Journal says that in some cases the rewards are far higher, with three positions recently filled at salaries of from \$80,000 to \$135,000. In addition, DP managers are likely to be in line for a variety of fringe benefits, such as bonuses and stock options.

Dependence on computer systems has also led companies to raise the status of DPMs.

## Bank systems 'can help spot fraud'

COMPUTER systems in banks should incorporate automatic checks and alarms to help spot potential fraud, says Ryal Poppa, chairman of Pertec, the

## Honeywell in Japan

AS planned (CW, July 27), Honeywell has established a new Japanese subsidiary, Honeywell Information Systems Japan Inc, in which it holds 80% of the equity. The other 20% is held by MOM, Mitsubishi Office Machinery, which has sold some Honeywell products in Japan since 1970.

The new company will concentrate principally on the Level 61 line from France, but will also sell some imported Level 64 and Level 66 systems.

Although systems based on the Honeywell Level 66 line are built under licence in Japan and marketed by NIS, NEC, Toshiba Information Systems, as the top end machines in the Level 77 line, about 10 Honeywell 6000s were sold in Japan by MOM, mainly to agricultural co-operatives, and these are due for an upgrade and are likely to be replaced by Level 66 machines built in Phoenix, Arizona, and sold by the new Honeywell company.

## Big things are hatching at Data Logic



This is leading either to the bringing in of top executives to take responsibility for DP or to DP executives moving into higher ranks.

The president of a New York consultancy, Associates for Human Resource Development, is reported as saying, "In the past, data processing was a dead end and a hungry executive had to jump ship to another department before he could land a vice-presidential spot. Now, such vice-presidents are common. We are even seeing the beginnings of empire building, where the data processing executives try to acquire as many other parts of the company as possible."

The way DP managers can equip themselves with communications skills to help improve relationships with users, and to take advantage of the increasing importance of DP, will be the main subject of a workshop "Successful User Relations" being organised by the Institute of Data Processing Management and Computer Weekly.

California's minicomputer maker. "The data processing industry has the capabilities to assist in the prevention of billing schemes that have been around for decades."

Most white-collar crime involves withdrawals of money from bank accounts and "savings and loan institutions," Poppa therefore recommends that online transaction systems should include routines which warn the cashier automatically every time an unusual transaction is requested — for instance, when most or all of the funds are being withdrawn from a relatively inactive account. The cashier would then, before proceeding, consult a bank officer who could call the police if fraud was suspected.

## CSC in \$225m Saudi deal

AN enormous contract, expected to be worth over \$225 million over five years, will shortly be negotiated by Computer Sciences Corp in Saudi Arabia.

The Saudi Ministry of the Interior wants a nationwide computer information system, and has chosen Computer Sciences to negotiate the contract. Detailed discussions will begin in September, after the Muslim Holy Month of Ramadan.

The Saudis want a complete turnkey system with central system, nationwide communications network and terminals, and in addition to expediting the processing of visitors — up to 300,000 a day in the pilgrimage season — the system

## Modcomp profit doubles

WITH record second quarter turnover and profit, the recovery at the Florida-based minicomputer, Modcomp, appears complete.

Profit for the quarter rose 85% to \$1.2 million on turnover up 16% at \$15.8 million. For the first six months of 1978, profit more than doubled at \$2.3 million on turnover up about 20% at \$30.5 million.

Modcomp has also announced Q4 prices for the new, classic 7870 processor (CW, August 3). A 7870 with 256K words of

## BC/7 gains ground in UK

ORDERS worth over £650,000 have been placed for the Univac BC/7 small business computer in the four months since its UK launch in April. There are 28 of the Intel 8080-driven machines now installed or on order, and Univac's advertising campaign for the machine has brought in some 1,700 inquiries.

The UK is currently the

## Fibres giant signs up SPL

THE Fibres Division of ICI has contracted SPL International to design and implement a minicomputer system for use in the production of polyester fibres at its Wilton works.

The system, based on a Digital Equipment Corporation PDP-11, will replace an existing computer system and will incorporate enhanced features such as improved displays.

To be run from SPL's Manchester office, the contract is the first to be awarded by ICI Fibres to an outside software house for the implementation of a total system. The software will be based on one of ICI Fibres' existing plant control packages.

## Prostel promoted in US

THE US promotion of the Post Office Prestel Videodata system is gathering momentum at the New York offices and San Francisco of the original developer, In-Data, Inc.

In-Data is now helping to demonstrate the system. The system now has two videodata terminals in the original and



Clerical methods were very different in 1878, when the Royal Army Pay Corps was set up to handle soldiers' pay. So were uniforms, as can be seen from this picture of a soldier (right) in the dress uniform of a Pay Corps lieutenant, circa 1878. Now, in the Pay Corps' centenary year, CMC data entry systems are used in place of manual methods and the Army is even encouraging soldiers to receive their pay by bank transfer, in place of the weekly Pay Parade held until recently at every Army depot.

## NEWS IN BRIEF

### Industry links with schools

THE Secretary for Education, Shirley Williams, has reaffirmed her belief in the importance of links between schools and industry (CW, March 9) by sending a circular to local education authorities asking them to review the effectiveness of such links in their areas. She emphasises the value of such organisations as the Science and Technology Regional Organisations which promote co-operation. All this is to increase the interest of pupils in "the wealth-producing sectors of the economy".

### Atkinson move

THE Department of Industry has confirmed that Reay Atkinson, director of the Central Computer Agency, is to take over from Martin Lam as head of the Department's Computers, Systems and Electronics Division. Robin Lingard, assistant secretary at SE Division, is expected to move to a different job within the DoI.

### Exhibition

EIGHT different personal computers will be on show at Ed Tech '78, an exhibition of educational and communications technology at Holland Park School, London from August 22 to 24. Among the computers will be the Commodore Pet.

### World survey

IN a survey of world business covering 750 major companies in 80 countries outside the US, only one manufacturer of data processing equipment is big enough to be listed, ICL. The survey is published by the US Magazine Business Week, and analyses the performance of all the key industrial companies. It shows ICL's sales for 1977 as being worth \$731.8 million producing profits of \$31.6 million.

### Legal system

A COMPUTER system for solicitors has been launched by Altergo Computers which can be run on either the Formula 1 microcomputer or the Avenger minicomputer. Called Precedent, the system handles client accounts, time recording, word processing and the production of legal documents.

### Dol spending

EXPENDITURE by the Department of Industry on R&D in Computers, Systems, and Electronics for the year 1977-78 was £2,996,000. This compares to the previous year's £10,371,000 and a projected figure for 1978-79 of £12,407,000. The Department's total expenditure on all areas for 1977-78 was £125 million. Among the computer research programmes that have been supported are those on computer networking, man-computer interaction, development of Coral 66, and microprocessor applications.

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# France to follow the Inmos trail

IN a move that closely parallels the current developments in the British microelectronics industry, the French now seem close to launching their own advanced technology microelectronics company, called Secimos.

The plans for the company, which are still the subject of active negotiations, look remarkably similar to an amalgam of the National Enterprise Board's Inmos venture, and the new joint company being formed by GEC and the US company, Fairchild.

Like Inmos and GEC/Fairchild in the UK, it will be a new company with a French manufacturing base aimed at developing new devices in advanced microelectronics technology to meet the growing number of new market opportunities. Like the GEC-Fairchild collaboration, it would involve the direct participation of existing US-based companies in the field — in this case, both Intel and Mostek.

Intel's participation in the venture will be direct enough to include a financial stake, thought to be around the 20% mark, as well as giving the venture second source licences on selected products and its N-MOS process technology. Mostek will also be providing second source licences, but French sources indicate that its financial participation would revolve around the new French company buying out the stake in Mostek held by another US company, Sprague. Should this happen, it opens the intriguing possibility of Intel becoming an indirect shareholder in Mostek, one of its main competitors.

The French partners in Secimos (Société Européenne Circuits Intégrés MOS) are, however, harder to pinpoint.

As the formation of the company forms a part of a still to be finalised overall "plan" for the French integrated circuits business, the French government is certain to be a principal shareholder. Private companies such as CGE (the French equivalent to GEC in the UK) is also being tapped for an important stake, and would no doubt take an active role in running the company.

An interesting addition to the potential shareholders roster however, is the State-owned car manufacturer, Renault, which is expected to come in as a sleeping partner. France's biggest industrial company, Saint-Gobain-Pont-a-Mousson, is also understood to want a leading position in the venture, or at least one like it that would involve Intel.

As with the UK's Inmos venture, the reasons that are bringing Secimos to fruition are based on a straightforward challenge and an analysis of the current industry.

The challenge is to get the French semiconductor industry to succeed in world markets with standard products, while the industrial analysis, carried out by a small team headed by the former president of Texas Instruments in France, Monsieur Bonelli, has proved that it is possible to arrive on the market late and still succeed.

This almost exactly parallels the thinking of the NEB and Mackintosh Consultants in the development of Inmos.

The industrial analysis has identified the telecommunications market as a prime target for new product developments. It is a market that is more active in Europe than in the US, according to the French, and therefore presents the best opportunity for a European manufacturer to gain an important share of a world market, as it develops.

One of the first products for this market will probably be a Codec (coder/decoder) system for digitising speech. This is an area already being investigated by several companies, including Intel.

Initially, however, Secimos will start operations with a range of some 40 devices second sourced from the catalogues of Intel and Mostek, a move which, it is hoped, will put the company directly into the world marketplace while at the same time benefit its own technological development. By having both Intel and Mostek second source agreements, Secimos would have alternative product solutions to many applications, hoping to expand its competitive capabilities.

Other computer game called Logic Five, it is due to be launched in October.

Based on a Texas Instruments TMS 1000, 4-bit microprocessor with no additional memory, it allows the traditional two players to zap each other's sixth fleet to an accompaniment of full visual and sound effects. At £27, it makes NATO war games seem a bit extravagant.

## Nippon claims the fastest microprocessor

TECHNICAL developments in integrated circuit design continue to push the capabilities of the devices into new realms of speed and power, and much of that development effort is now being concentrated in Japan. This has again been illustrated by the introduction of a 16-bit microprocessor by Nippon Electric, which is claimed to be one of the fastest processors produced so far.

Samples of the device, called the MicroCom 1600, are scheduled to be available later this year.

Two particular design innovations have been used to produce the device which give it a register-to-register add time of 0.5 nanoseconds. The primary design development employed was the layout of the circuit elements to ensure that the interconnection paths between them do not exceed four microns in length. In addition, an enhancement depletion type device construction technique is used that involves the partial

incorporation of SMOS technology in the device, and leads to a low rate of power consumption that is, typically, one watt.

According to Nippon, the register-to-register add speed is faster than some minicomputer systems that are available, and between three and eight times the speed of existing microprocessors.

Up to 1 Mbit of memory will be directly addressable with the device, and it will include eight different addressing modes to improve the utilisation of program memory.

**Micro chess**

INTERNATIONAL chess master, David Levy, is to direct the Microchess championship which is one of the attractions being planned for a personal computer exhibition at the West Centre Hotel, London. The championship, to be held on September 21-23, will feature small computer systems playing chess against each other.

## Edited by Martin Banks

## Iskradata 1680 from Yugoslavia

WHAT is thought to be the first microcomputer system to be designed and built by an East European Socialist state has been introduced by the Yugoslavian electrical and electronics company, Iskra.

The system, Iskradata 1680, based on a Motorola 6800 microprocessor, follows standard architectural thinking in its design, in that a central data bus is used to allow the construction of flexible configurations.

Available for the system are single board modules for the CPU, a range of memory cards that allow expansion up to 84K bytes, and parallel and serial I/O. In addition, there are facilities for EPROM programming and eraser, and the system comes complete with a front panel console that allows direct access to the microprocessor registers.

The system can operate with teletypewriters, up to four video terminals, four floppy disc drives, and a variety of printers. Its software currently includes a monitor, Basic, Assembler and Disc Operating System, and some applications programs have already been developed. Additions to the software products range are expected later in the year.

According to French sources, competition will be a dogma with the new company, not only with other French manufacturers such as Sescosme, but also on the world market.

An early requirement for the company, once it is formally launched, will be the hiring of some 20 circuit designers and, as with the UK industry, it is considered imperative that some of the indigenous engineers that have "brain drained" to Silicon Valley be tempted back to the home industry.

Though at 400 people, the estimate of total staff required is well under the projections for both GEC/Fairchild and Inmos, and is probably a more realistic figure considering the plans for "off-shore" assembly of the devices in Tunisia and Morocco.

The turnover target, however, is being set high, and the objective is to hit the F400 million mark by 1985. This is based on an estimated 30% share of the French market, together with a significant share of the total European market.

I do not agree that a BNV must be paid for by taxing the more affluent any more than they are for unemployment costs. I suggested that a BNV should be set at a level equivalent to unemployment payments. The lower salary increment paid by the employer could be such that the employee's receipts, the burden on the company economy and taxation on the rich would be the same. The important difference would be that the increment to a company's salary bill when hiring a person would be smaller. Beacons and I have an import-



NOTHING, it seems, is sacred from the advance of microprocessor applications, as the picture above shows.

Those happy school days spent at the back of the class during the Latin period, playing battleships happily and quietly on pieces of paper are soon to be banished forever. From now on it will be computerised. This is Computer Battleship from MB Games, and together with another computer game called Logic Five, it is due to be launched in October.

Based on a Texas Instruments TMS 1000, 4-bit microprocessor with no additional memory, it allows the traditional two players to zap each other's sixth fleet to an accompaniment of full visual and sound effects. At £27, it makes NATO war games seem a bit extravagant.

## Another PROLOG group

I REGRET that Michie's Privateview (CW, August 3) failed to mention all PROLOG groups. He used a sentence that gave the impression that PROLOG is only available in four places.

At least one more group is at work — at the National Civil Engineering Laboratory, NCEL, in Lisbon, Portugal. It would have been nice to have this

group noted, as the machines used are different from the commercial ones listed by Professor Michie. HELDER COELHO, Edinburgh

I DO hope Inmos is not set up in Glenrothes merely because it is a marginal Labour seat. GRAHAM JONES, Ash, Kent.

# Basic wage and labour costs

I AGREE with many of the points made by Geoff Beacons in his article (CW, July 20). We do, however, interpret certain words and phrases differently.

## LETTERS

I do not think in terms of a fall in the value of labour so much as a reduction in its incremental cost over the cost of unemployment. Labour which is made redundant by one form of technology can be of value in alternative jobs provided the customer can pay for it. We are in the ridiculous situation of paying many unemployed to do nothing at a level which prevents an employer taking them on to provide goods and services at a price we can afford. A basic national wage on the terms I have described would help overcome this problem.

I do not agree that a BNV must be paid for by taxing the more affluent any more than they are for unemployment costs. I suggested that a BNV should be set at a level equivalent to unemployment payments. The lower salary increment paid by the employer could be such that the employee's receipts, the burden on the company economy and taxation on the rich would be the same. The important difference would be that the increment to a company's salary bill when hiring a person would be smaller. Beacons and I have an import-

difference in belief which creates different assumptions. I believe that, subject to the safeguard of subsistence for everyone, the free market should decide what the customer wants to buy. Beacons says the decision at the door of a group of people who decide where and how subsidies should be paid in the hope that they decide on a service or product that the market wants. I do not say the subsidies can only be a short term measure but that, if used, they should only be a measure to overcome a short term problem since otherwise they are countering a natural market disinterest.

In conclusion, the way of introducing a BNV and adjusting the tax methods needs careful consideration. The taxation must not nullify the incremental accounting that is the advantage of a BNV and negative taxation does not look suitable either.

DERRICK GROVER, Haywards Heath, Sussex.

## The final indignity

IN Downtime, Chad refers to the Post Office being immune to errors in cutting off telephone connections.

We are a sub-post office and pay our telephone bill via our weekly returns to Cambridge head office. Our remittance for July 1978, was apparently mislaid within Cambridge and we subsequently received a final demand.

Our protestations were referred to the man "with his hand on the switch" only to be told that he had no record of us being a sub-post office. Goodbye and click!

The final indignity was to get the line reconnected via the telephone kiosk which has stood in our front garden since 1937 — rent free!

R. NEWTON, Saffron Walden, Essex.

## Another PROLOG group

I REGRET that Michie's Privateview (CW, August 3) failed to mention all PROLOG groups. He used a sentence that gave the impression that PROLOG is only available in four places.

At least one more group is at work — at the National Civil Engineering Laboratory, NCEL, in Lisbon, Portugal. It would have been nice to have this

group noted, as the machines used are different from the commercial ones listed by Professor Michie. HELDER COELHO, Edinburgh

I DO hope Inmos is not set up in Glenrothes merely because it is a marginal Labour seat. GRAHAM JONES, Ash, Kent.

# f.m. tuner

Our article in this issue describes an f.m. tuner based on an already highly successful design by L. Nelson Jones. The author has now redesigned the circuit around two new integrated circuits which offer an even better performance. A modified and pre-aligned front end module provides a large signal handling capability and simplifies alignment.

**Trends in Microprocessors.** See also a general discussion on developments now taking place in 4, 8 and 16-bit devices and in bit-slice systems.

**Tunable or Parametric Audio Equalizer.** We describe one which functions as notch filter, shelf filter, graphic equalizer or bass and all-type tone control.

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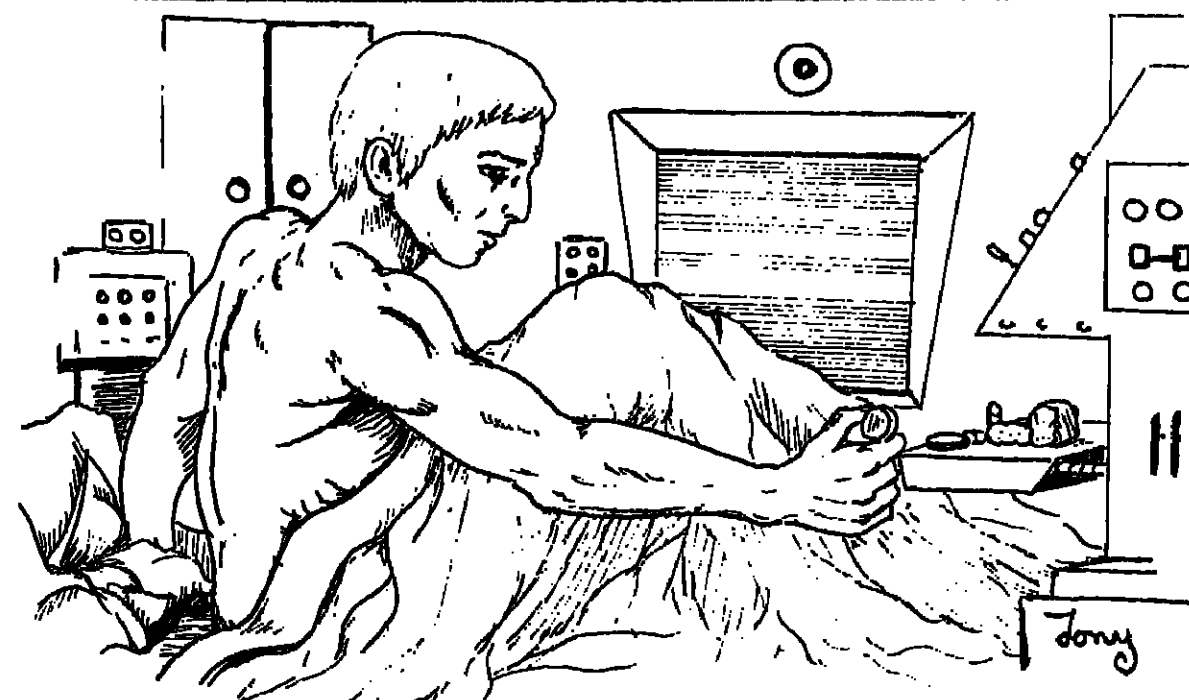
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 ADDRESS \_\_\_\_\_  
 TELEPHONE \_\_\_\_\_  
 MY COMPUTER IS \_\_\_\_\_  
 MY APPLICATION IS \_\_\_\_\_

EXT

**FPS WITH OVER 500 INSTALLATIONS IS ALSO THE WORLD'S LARGEST SUPPLIER OF ARRAY PROCESSORS FOR MINICOMPUTERS.**

One of the two special prizes in the Computer Weekly/Dataskil essay competition, Computerstyle 2000, went to PAUL HOLDEN of Dublin, whose entry appears below. Holden, who works for Applied Management Sys-

tems, sees life as clinical, uniform and regimented. The hero, Stoddard, dreams at night of a different culture based on small communities. Just as he reaches the climax, the machine wakes him with the next day's timetable ...



Our hero, after being given his timetable for the day, consumes his regulation breakfast. Experience had taught him that to omit it or for that matter, any of the ingredients in the meal was dangerous. One visit to the infirmary was enough.

# 'Good morning Stoddard, here is today's timetable ...'

SLOWLY, the euphoria drained away. He couldn't hold on to it. He was being dragged down. His head felt numb, and he was unable to focus on anything. The spark of light went out.

Heaved out of bed, and the luminous cursor appeared on the screen and began its tireless dance, leaving behind it a string of words.

"Good morning, Stoddard. Here is your timetable for the day."

It always began like that. He remembered, with faint amusement, how it had once bade him a happy new year three days in a row. Now it was always "good morning." Somehow, he felt, programs with bugs were more interesting.

The list of instructions — euphemistically, his "timetable" — made no more sense to him that day than any other. He had to be in certain places at certain times. He had to carry pieces of paper from one place to another. He had to sign things. He had to copy sections of text, by hand, from one piece of paper on to another. He had to read aloud from a document for half an hour in an anechoic chamber. He saw no sense in it.

Though he saw no sense in it, he knew, or rather he felt, that it was not worth bothering to ask. There was no one to ask. No screen would respond to impertinent questions like that. Other citizens grew up like him, were educated like him, lived like him. They conformed, because it was impossible to consider an alternative. Whenever a stray doubt crossed your mind, the feeling of being watched intensified. The screen seemed to grow brighter. You learned not to think those kind of thoughts. It was more comfortable.

This breakfast came out of the slot. It was the usual combination. Two slabs of white cellulose lay on the plate with half a dozen pills. He knew that the bread, a tasteless mass, was only to supply bulk, and that the pills contained all the nutrients considered essential by the Department. Experience had taught him, however, that to omit it or for that matter, any of the ingredients in the meal, was dangerous. One visit to the infirmary was enough. He was lucky to have recovered from the experience.

He began on his timetable. As always, the screen knew where he was, because he was where the screen had told him to be, in each place. The screen

reminded him of his duties, where to go next and what to do there. He did what he was told.

The complex had a canteen in the basement. He had lunch there, along with the hundreds — maybe thousands, he never knew — of others in front of the dispensing machines, who placed their hands on the pad, and were delivered personalised meals through a slot. The ingredients were carefully calculated to supply the correct nutrients for their weight and height. The meal consisted of some tasteless bulk and a handful of pills.

He took the plastic plate to a table where three people, two women and a man, were already seated. He vaguely recognised two of them, but was embarrassed that he could not recall their names. He had never seen the blonde woman before. The three were talking when he sat down, discussing the weather.

"My friend in Weather," the taller woman was saying — Kama, that was her name — "told me that tomorrow would be fine, but that they had to arrange some rain for Wednesday. Something about visiting foreign dignitaries."

"Well, I hope you give us a decent summer this year," the man, his mouth full of the brown fibrous stuff, spoke up, "not like the last few years. One week sunshine, one week rain. Those guys in Weather have no imagination." The group fell silent, and Stoddard could not think of anything to contribute to the conversation.

Somewhere a buzzer sounded, and the three stood up to go, nodding at Stoddard on their way.

He knew that the bread, a tasteless mass, was only bulk and that the pills contained all the nutrients considered essential by the Department.

For the afternoon, his instructions were different. He was to report to the gymnasium for a programme of exercises. "Sport," they called it. This started appearing on his timetable some weeks previously. He had mentioned one day at lunch that he felt tired. Now his programme was such that he finished each afternoon truly exhausted.

The large screen displayed his target — 10 laps at 20 kilometres per hour. It showed that he had completed seven laps at 28.5 kilometres per hour, when he fell. He limped painfully to the console, and reluctantly, requested assistance.

He was helped to the clinic by a white-coated orderly. There was a queue in front of him — twisted ankles, like himself, cuts and bruises, and a couple of middle-aged men who had clearly overdone it, he thought. They were coughing and gasping for breath. The queue moved slowly.

He came out with his ankle bandaged up, grateful that they hadn't sent him to the infirmary. It was dark. The screen told him to report directly to the Entertainment Centre.

When he realised that he had missed dinner, a strange feeling overcame him. He remembered the last time, and he felt sick, with a mixture of fear, excitement and hunger.

Nausea gripped him during the mating session at the Entertainment Centre. It was beyond him that people used to enjoy this. As soon as he could, he went to his room, took the pills and lay down. The screen went blank.

The empty feeling in his belly swept up and over him, filling his head with a sort of lightness. When he closed his eyes, the world became more vivid, more alive. He entered this world gladly.

The first rays of the sun were playing with the drops of condensed moisture on the window when he opened his eyes. Around him in the long room, seven others were waking, struggling into clothes. It was

cold. Jobina was already sitting at a terminal, occasionally jolting down some notes on a pad. Orchard was looking over her shoulder. As they came downstairs, they each helped themselves from the large black pot of oat porridge that had been on the stove all night and sat at the long table. They ate in near silence, and then began planning their activities for the day.

Their speciality was carpentry, and their skills were much in demand. Jobina reported that

can get that old one fixed up, we can save ourselves about three hours' labour a day."

The screen flickered in response to Canace's fingers.

"Not in South-West-Nine. But hang on a minute, someone in South-West-Three can fix the mill, and they need onions and a pair of shoes. So we can do the deal with South-West-Nine through South-West-Three."

"Okay, but warn them that they'll have to wait a few weeks for their table."

The group split up, some going to the workshop, some to the fields. Stoddard and Jobina took the truck to a commune situated about ten kilometres distant, where they were needed to replace some floorboards and fix a rail on the stairs.

There were orders in for five kitchen tables from communities within a sixty kilometre radius. They were committed to supply three of these within a month. The other two were the subject of discussion.

"But what have they got?" one of the men was saying. Canace entered a few words on the keyboard.

"They have leather and onions."

"Sounds like last night's dinner," someone interrupted, laughing.

"And they repair agricultural machinery."

"Hey," Stoddard himself spoke, "find out if anyone knows anything about grain mills. If we

could, Jobina was already sitting at a terminal, occasionally jolting down some notes on a pad. Orchard was looking over her shoulder. As they came downstairs, they each helped themselves from the large black pot of oat porridge that had been on the stove all night and sat at the long table. They ate in near silence, and then began planning their activities for the day.

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A CONFERENCE aimed at senior management and entitled the Profitable Exploitation of Microprocessor Technology has been organised by European Study Conference and will take place at the Hilton Hotel, London W1 on September 2. Speakers will include Dr. Joe Stuart, Trevor Gilpin and Dr. Christopher Evans from the DPL, Barrie Sherman the research director of STMS, and J. Delaney from SSC Ltd, Kirby House, 11 High Street East, Uppington, Rutland, LE15 9PY, tel: Uppington (0773) 2711.

THE 1978 Conference of the British Association of the Institute of Physics is to be devoted to stability problems in engineering structure and components. The conference will be held on September 12-14 at University College, Cardiff. For further information contact: Roger Rogers or A. Dunn on Cardiff 2451.

Structural Engineering, University College, Newport Road, Cardiff CF2 1TA, tel: 0222 42411, ext 7073.

A THREE-DAY seminar entitled Team Management and Organized by Computer will be held at the Langton Information Systems in Amsterdam on September 4-6. It is aimed principally at IT managers, project and user management. Further details can be obtained from Michael Naughton at Langton on 01-434 4400.

A PROGRAMME of word processing workshops is scheduled to take place at the Stockport College of Technology on September 12-14. It has been organised by the Management Studies Centre of ICPC.

A three-day supervisors' course will run concurrently with the workshops, and there will also be a display of equipment. For further details apply to Management Studies Centre, 61A George Street, Richmond, Surrey TW9 1HL, tel: 01-894 9888.

NTT, 1-8 Uchisaiwai-cho 1-chome, Chiyoda-ku, Tokyo 100, Japan.

MULTI-MICROPROCESSOR Systems is the title of a conference organised jointly by the Polytechnic of Central London and the French Institut de Recherche d'Informatique, IRIA. It will take place at the Polytechnic on October 2-4. For application forms write to IRIA, SEPI-Formation, B.P. 105, 78150 Le Chesnay, France, tel: 094 90 20, ext 676.

VIEWDATA — the paperless carriage? was a seminar presented by Mills and Allan Communications on June 21. It is to be repeated on September 27, with the addition of a session by Ken Knight, entitled Introduction to Prestel. Further details from Mills and Allan at Broadwick House, 15-17 Broadwick Street, London W1P 2AT, tel: 01-439 8841.



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You will have gained some management experience, possibly in a Team Leader position and will need the ability to control and motivate a small department in a strong marketing environment.

You will report directly to the senior management of a small British company that services customers throughout the UK and Europe. Your management skills will go hand in hand with the technical competence you will exercise on a day to day basis. Relevant skills in a pre and post sales environment, particularly benchmarking could secure you this leading post.

Please telephone Geoff Marsh on 01-499 4501 for more details.

RW 33/2

**RSX-11 M  
RTL/2 CORAL MACRO  
Intel 8085  
BERKSHIRE**

This substantially backed software house, located in an attractive Berkshire town, develops Telemetry systems for a wide portfolio of clients. The hardware used is PDP/11 with RSX-11 M and some work is now being done using Intel 8085 micro-processors. Languages currently in use include RTL/2, Coral and Macro. It is no exaggeration to state, therefore, that the company is working at the forefront of computing technology.

Growth in the business has generated several career appointments for mini and/or micro-programmers at various levels of experience. The company offers an attractive benefits package, including a salary negotiable up to £7,000 to match individual experience.

There is a very attractive working environment and the stimulation of working with enthusiastic colleagues.

Please telephone TONY BAKER on 01-499 4501 to find out more — you can lose nothing and it may very well be to your benefit.

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Ref. RW 33/3

**CONTRACTORS**

PROGRAMMERS - ANALYSTS - OPERATIONS STAFF

HUTCHINSON SCOGGINS CONTRACTS LIMITED is a company formed by demand. Our clients, for whom we have been recruiting over many years, have increasingly been asking us to supply contract people in addition to permanent staff.

It has always been our policy to provide these clients with the best available staff from our register. In return, our staff are offered the best assignments.

We now find it necessary to enlarge our register of contract people. If you are a mature Data Processing person with genuine experience in your trade, a pride in your achievements and enjoy variety in your working diet, it may be that we have the contract for you.

Ring Brian Dawson on 01-499 4501 for more details.

Out of hours, please leave a message on our answering machine — we will contact you.

RW 33/4

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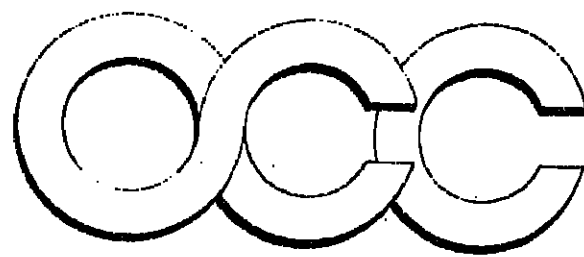
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**COMPUTER WEEKLY**

01-499 4501





## occ computer personnel limited

### Customer Support

London: Birmingham: Manchester  
£5,000-£6,000  
+ car allowance

Our clients, major international computer manufacturers based in the UK, are moving into the mini market. Their latest development is a small business computer aimed at the commercial market, particularly for small users. As part of their marketing plans they are looking for customer support analysts.

Working in the Business Systems Division you would provide technical support in a pre-sales situation by technical surveys and presentations, or you would provide post-sales support with responsibility for implementation and installation. There is also the possibility for project involvement.

The ideal candidate would be commercially oriented and have a substantial knowledge of small or medium systems, e.g. ICL 2903, 2904, System Ten, IBM System 3, System 7, etc. He or she should have programming experience to an intermediate level and implementation knowledge. It is essential that candidates have good communications skills and an understanding of business organisation systems and objectives.

Ref: 150/CW/Fran Setter

### Salesmen

Various Locations  
Salary negotiable

Vacancies exist for experienced salesmen with a number of leading computer manufacturers, particularly those marketing small to medium-sized systems.

You would be involved in selling small business computers in a commercial market, mainly to small users. In some cases this will be pioneer type selling.

Ideal candidates should be experienced in hardware sales, particularly in selling to small users. Knowledge of small to medium-sized machines is essential, e.g. ICL 2903, 2904 System Ten, etc. In some cases, in addition to hardware sales, total systems sales would be useful.

Salaries generally consist of a basic plus guaranteed commission.

Ref: 151/CW/Fran Setter

To apply for any of the above positions or for further information, please telephone the Consultant concerned during working hours on 01-242 9356, or write to the above address.

If it would be more convenient to telephone in the evening, or weekend, the telephone numbers are:  
Sharon Matthews — Billerica (02774) 22381. Marian Tabona — 01-555 5568. Fran Setter — 01-874 6372.

### Tehran

Software Specialists  
to \$£36,000 tax free  
+ housing, etc.

H6000/level 66 systems software

A major US corporation currently requires experienced software specialists for a H6000 project in Tehran. These are key positions within the project team and successful candidates will be responsible for support and enhancement of the operating system and related software, including communications interface for real time and on-line applications. Candidates must therefore have in-depth experience of H6000 software, covering one or more of the following GCOS, IDS, TDS, GMAP, MDGS.

The initial contract will be for 18 months and an excellent remuneration package is offered including excellent tax free salary as above, free furnished accommodation, school fees, 20 days' paid holiday, initial and intermediate return air fares, free work transportation and comprehensive insurance cover.

Ref: 454/CW/Sharon Matthews

### Middle East

Systems Programmer  
c£8,000 tax free + benefits

IBM 370 DOS/VS CICS

A leading American engineering company has computer installations worldwide, to serve the petroleum industry. A Systems Programmer is urgently required to join the data centre in Dubai. The installation consists of an IBM 370/135 which is to be upgraded to a 138 in September. Applications are general commercial systems.

The successful candidate will have a minimum of 3 years' D.P. experience including at least 1 year as a Systems Programmer using IBM Assembler, DOS/VS and CICS. A computer science degree would be an advantage, although it is by no means essential.

The company offers excellent working conditions, and benefits include 30 days' leave with a return flight to the point of origin, accommodation and an allowance for commodities.

Ref: 740/CW/Marian Tabona



## ISLE OF WIGHT COUNTY COUNCIL

### TREASURER'S DEPARTMENT

#### R.P.G. II Programmer

AP2/3. Salary £3279 to  
£4146 per annum inclusive

The County Council operate an IBM 12K 370/115-2 with 3 X 3340, 2 X 2311, 1 X 3203, 1 X 3540, 1 X 2501 and applications are invited for the above post from programmers with at least two years' experience of R.P.G. II associated with an IBM installation working under DOS/VS and Power. Knowledge of VSAM would be an advantage.

Application forms and job descriptions can be obtained from the County Personnel Officer, County Hall, Newport, Isle of Wight.

Closing date: August 31st, 1978.

### DATABASE MAN (M/F)

Good knowledge of CICS to set up new Database system.

£8000 plus excellent fringe benefits

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### Computer Operator

£4144 - £4668 inclusive

To operate, on a two-shift system, a 192K 19037, running under the George 3 Operating System. He/She must have at least 18 months' experience, plus common sense, initiative and willingness to play a full part in operating present, and developing future, applications. Good academic background (up to A-level standard preferred). Opportunities for promotion in the operating and development divisions. 21 days' annual leave, plus ten statutory days. Staff restaurant. Season ticket scheme. Written applications, giving age, full details of education and career to date, to Computer Services Manager, Computer Centre, Town Hall, London SW18 2PL, by 28th August.

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If you think your record so far is good enough to impress us at BCL, you could join a dynamic sales and marketing team as a systems adviser, project leader, salesman, programmer or analyst programmer in London, Birmingham, Manchester, Leicester.

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Contact Eric Gilliland, Sales Director, on 01-207 3344.

Tell him your success story so far and your ambitions for the future. Or write to him in confidence to:

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UNIVERSITY OF SALFORD  
COMPUTING LABORATORY  
Applications are invited for the post of  
**COMPUTING OFFICER**  
(Systems Software)

The Laboratory provides a general computing service to the University based upon an ICL 1904S and a PRIME 400/300 configuration. It is also highly involved in the North West Universities Network project which links five universities. The main duties of the person appointed will be in enhancing the George III operating system of the 1904S to continue the work development and in the ongoing provision of the overall 1904S service.

The salary will be in the range £3,500-£5,178.

Further particulars and application forms may be obtained from the Registrar, Salford University, Salford M6 6PU, and should be returned by 28th August 1978. Waiting reference CL/55/CW.

## Systems Programmer

WIR. 1978/000000

If you have a good systems programming knowledge of OS/VS1, this is the opportunity to put that to good use and to make a significant and immediate contribution to the setting-up of a new installation.

An IBM 370/138 is to be installed replacing current hardware and on-line and RJE facilities are to be developed.

You will be involved in the evaluation of available software and its implementation and give advice to the department as to the most effective use of hardware and software. It is essential that you are able to communicate effectively with both operations and development staff.

This is a very full role providing tremendous interest and variety, including close liaison with European centres.

The company is a manufacturing organisation, already leaders in their field, enjoying a rapid rate of growth. This expansion will have significant impact on the development of the DP department in the immediate future. Consequently, great emphasis is placed on personnel development and training.

Compensation will be in the region indicated above plus attractive relocation expenses, where appropriate.

Telephone our CROYDON office for more information or write enclosing brief details of experience quoting ref. CW29-BH.

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19, PARK STREET, CROYDON, CR9 1TN

061-236 9085 FAULKNER HOUSE  
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M1 4YD

## Programmer /Analyst

Motorola's lead in the semiconductor industry has been established through continuously progressive policies and high standards of selection.

At present we are looking for a well-qualified computer professional for the key post of a Programmer/Analyst at our East Kilbride manufacturing complex.

Our modern and well-equipped computer unit operates in liaison with similar groups in Geneva and Toulouse, and we have three RJE terminals to Motorola computer centres in Phoenix and Chicago.

The man or woman appointed will have around five years experience in

programming and systems analysis and complete familiarity with IBM O/S. Experience of COBOL is essential and a knowledge of TSO would be useful. This should be backed up by experience in a manufacturing environment and a willingness to travel in Europe.

A substantial executive compensation package is offered, consisting of a generous salary and an excellent range of management benefits.

Please write with full details of your career to date to Alan Smith, Personnel Officer, Motorola Limited, Colvilles Road, East Kilbride.



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## COMPETENT MINI COMPUTER PROGRAMMERS

To join an expanding team working on varied high technology projects including N.A.S.A. Space Shuttle Programme.

Applicants should be experienced in Fortran, with good mathematical background and preferably engineering experience.

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A high level Systems Programmer with IBM 370 experience and a knowledge of COBOL and Fortran. Must be able to communicate effectively with operations and development staff.

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Group leader required with proven management experience and preferably a programming background. Applications are invited from a systems manufacturing environment.

**To £6K SYSTEMS ANALYST** Herts  
A background of commercial experience is essential and capability of supervising others in the project management role is desirable. IBM 53 in distribution environment.

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An O & M qualification and minimum one year experience is required for this position. The programming involved in-house with a systems manufacturer.

168 Finchley Road, London, NW3 6HP

## AUSTRALIA SYSTEMS ANALYST

We are the service company for the Australian banks national credit card scheme - Bankcard.

Our Systems Manager is visiting Britain during the second half of September. He would be interested to meet Systems Analysts who are considering emigrating to Australia. (Our offices are in the Sydney area.)

If you have spent more than 5 years in EDP with some proven Systems Analysts experience with batch applications, please send a resume to reach me by the end of August.

We operate IBM/370 equipment in both batch and real-time modes. Network applications are front-ended through PDP minis.

We shall negotiate attractive salaries and benefits for the right applicants.

Please send resumes to:

Allen Smith, Senior Systems Analyst  
CHARGE CARD SERVICES LIMITED  
P.O. Box 73  
Auburn, N.S.W. 2144, Australia

## EXCELLENT OPPORTUNITIES FOR CONTRACT STAFF

In line with current expansion plans we will be pleased to hear from programmers, analysts and consultants of professional disposition with a solid background on any of the following disciplines:

**MARK IV FORTRAN  
COBOL, BASIC  
PL/1 RPG  
BAL**

and any DATABASE or TP MONITORS

Forthcoming internal projects include developments on in-house equipment. Current external projects are both U.K. wide and overseas-based.

Please telephone or send career details to:

MARGARET DRISCOLL  
TANGENT COMPUTER SERVICES  
BROOK HOUSE, 4 EASTERN ROAD  
ROMFORD, ESSEX RM1 3PJ

TEL: ROMFORD 0708-44181/2

Top contract fees

## Project Leader

Systems Development  
Lancashire, to £7,000

G.M.S. Computing Limited, an expanding autonomous subsidiary of the Johnson Firth Brown Group, provides bureau services to both in-house and external clients. Consistent demand for the company's wide range of services has created the need for a new project team based west of the pennines. The successful candidate will lead a small multi-purpose team concerned with all aspects of application systems from design through

to implementation. Applicants, aged at least 25 and ideally graduates, must have in-depth project experience in a manufacturing environment. The ability to work without supervision is essential. The current management is young and enthusiastic and there are excellent career prospects. Consideration will also be given to appointing other candidates with potential to less senior positions.

J.C. Parkin, Ref: #5202/CW

Male or female candidates should telephone in confidence for a Personal History Form to: SHEFFIELD: 0742-731241, Bank House, 100 Queen Street, S1 1UF.

# Hoggett Bowers

Executive Selection Consultants

BIRMINGHAM, CARDIFF, GLASGOW, LEEDS, LONDON, MANCHESTER, NEWCASTLE and SHEFFIELD

## South West Thames Regional Health Authority DATA CONTROL SHIFT SUPERVISOR

Tooting, London SW17

£4496-£5659\*

The introduction of 2-shift working has created the need for an additional supervisor to be based at the Regional Computer Centre located in the grounds of the Springfield Hospital, Tooting, London SW17.

The person appointed will take charge of a small data control group responsible for controlling the workflow between the Regional Computer Centre and its users.

Computing, within the centre, is based on powerful ICL 1903T hardware, running under George 3, which supports a variety

\*Including Shift Allowance and London Weighting

of management information, financial and medical applications.

Close liaison with other Operations Department Section Heads is also an essential part of the job. Previous experience in a data control environment although desirable is not essential as full in-house training will be given.

For further details, phone me, Les King, up to 8.00 p.m. each evening, or write to: Modern Computer Services Limited, FREEPOST, London WC2N 5BR, 01-639 3351.

Freelance Contracts **MODEM** Permanent Positions  
Consultants in Data Processing

# MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

## LOOK ANALYSTS!

MIDDLESEX

To £6500

With a major upgrade in hardware scheduled for the near future, and a corporate development plan agreed, our client's commitment to D.P. is well established. As a result of this they are able to offer an attractive future to analysts wishing to pursue an active career path, and gain experience utilising Database and Distributed Processing techniques.

If successful, you will probably have been involved with the development of at least one complete system. Beyond that, no specific experience is asked for, only confidence in your own ability and a desire to reach the zenith of your chosen career path.

The company offers an attractive benefit package in addition to the basic salary, and provides a modern and pleasant office environment. These positions are true opportunities for career advancement and can lead to an exciting and demanding future.

Ref. W1/1708

## COBOL PROGRAMMERS

CITY OR HOME COUNTIES

c £5000

We wish to appoint a COBOL Programmer for our client, a large, well established organisation with diverse interests.

The company has offices in the City and in the Western Home Counties and successful candidates can be based at either location.

Applicants should be able to offer from one year's COBOL programming experience gained on Honeywell, Univac, Burroughs or IBM hardware. There are opportunities to gain more user contact, eventually progressing to systems analysis. Alternatively programmers can progress into the more technical software development area to broaden their knowledge of the industry.

The position carries an attractive salary which is further supported by financial benefits making a comprehensive and generous package.

Ref. E1/1708

## 3rd GENERATION IN SURREY

PROGRAMMERS £4500

£6500 ANALYST/  
PROGRAMMERS

If you can offer one or more of the following, our client can offer you the opportunity to consolidate your career with a 3rd generation environment:

- ★ IBM 370
- ★ COBOL or ASSEMBLER
- ★ SYSTEMS DESIGN/IMPLEMENTATION
- ★ PROGRAM SPECIFICATION
- ★ FEASIBILITY STUDY

Because of the competitiveness of their business, it is considered essential to utilise modern computing techniques wherever possible, so the demand for data processing systems within the group continues to rise significantly. Two additional Analyst/Programmers and four Programmers are now required to strengthen the department and the salaries range from £4500 to £6500 depending on experience.

Conditions of employment are above average and the location is a quiet and attractive district of Surrey. Ref. S1/1708

## PROGRAM YOUR OWN CAREER

N.W. LONDON

c £5000

Our client, one of the largest companies in their select field of operations, are keen to keep pace with the latest advances in computing hardware and technology.

They have recently installed a large mainframe in their London offices to support on-line systems from their regional centres.

They are now seeking to develop applications to streamline their services and require COBOL programmers with a minimum of one year's commercial experience who can generate the professional enthusiasm to assist with the introduction of the new systems.

The successful applicants will be working in an environment where DEVELOPMENT as opposed to maintenance, with DATABASE, and on-line programming techniques are available. The company also offer competitive salaries, four weeks' holiday, pension schemes, flex-time and a staff purchase scheme. Ref. N1/1708

24-hour answering service

Please telephone for a confidential discussion or write to:

30 Fleet Street London EC4Y 1AA  
01-353 0981

# PERMANENT

## ESSEX

### SYSTEMS ANALYSTS

to £6k

If you have one or more years in Systems and like working for a Manufacturing Company involved with developing new systems, then our Client would be very keen to see you to discuss existing career prospects. Expertise of IBM Mainframe Computers would be a distinct advantage. 1CA17

### SYSTEMS ANALYSTS

to £6.3k

Our Client is seeking at least three good systems people to help them develop their Real-Time MIS projects. Based on a number of Univac 90/30 machines the current system is supporting over 140 VDU's. If you are interested in gaining excellent on-line experience in a dynamic environment with first class prospects, please do not hesitate to phone us immediately. 2CA17

### ANALYST PROGRAMMERS

to £5.5k

If your background relates to IBM 370 Cobol preferably with some Assembler and you like working in a progressive atmosphere developing new systems then our Client would be very interested in talking to you about your future. Numerous large company benefits are offered. Please phone now for immediate assessment of your chances. 3CA17

### PROJECT LEADERS/SYSTEMS ANALYSTS

to £7k

Our Client, a large manufacturing and wholesale company is seeking experienced Analysts and Project Leaders to help them enhance and develop their business. Centred around an IBM mainframe configuration, these opportunities provide you with an excellent chance of furthering your career locally. Phone now for details. 4CA17

### CHIEF PROGRAMMER/SYSTEMS DESIGNER

to £7k

If you have good PL1 experience and have the ability to motivate and inspire people to produce good Systems under your guidance or if you have expertise in design of advanced systems then our Client would be very interested in talking to you about your future prospects with them. Please us immediately for more details. Information. 5CA17

**LINSCOTT**  
Computer Systems Limited

## ANALYSTS/ANALYST PROGRAMMERS/PROGRAMMERS

to £6.5k

Our client is located in a rural setting where housing and living costs are very modest. The configuration consists of a large IBM 370 grouping operating in Real Time mode and supporting over 100 VDU's. If you have sound financial systems experience and/or Cobol/Assembler and you fancy cutting costs all round, including travel, then please do not hesitate to telephone us now. 6CA17

## SURREY

### PROGRAMMERS

to £5.3k

Only two years experience of IBM 370 Computers using BAL or PL1 could lend you in a lucrative position with this very progressive company involved in the financial and insurance markets. A 4% mortgage is also offered, together with the normal large company benefits. 7CA17

### PROGRAMMERS

to £4.8k

If you have only 18 months Cobol experience preferably with IBM 370 Computers then here is an ideal opportunity to move quickly for a high salary and excellent prospects. Our client is a large dynamic Chemical concern. Don't hesitate to get in touch for more information. 8CA17

## CENTRAL LONDON

### SENIOR OPERATIONS RESEARCH ANALYST

to £8k

If you can supervise and possess experience in Linear Programming and have sound operational research ability, then our Client would like to talk to you immediately to gauge your suitability for this very interesting post. An IBM background would be to your advantage. 9CA17

If you can't see anything here that suits you, still get in touch with us - We have many additional well paid vacancies in Essex and the City.

Telephone John McLean for an up-to-date list of current opportunities on

**BRENTWOOD (0277) 212021**

or write to him at:  
LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. BOX 74, BRENTWOOD, ESSEX CM15 0BZ  
Licence No. 9E(A) 3007

## CITY OF DERBY Delightful area close to Peak National Park PROGRAMMER

Salary £3732-£5073  
(inclusive of supplements)

The successful candidate will join a team developing a variety of applications, including on-line systems.

In September, the Authority will take delivery of an ICL 2950 which will replace the present 1902S. The new machine will initially be run using DME/3 and use of VME/K is planned.

Applicants (male or female) should be suitably qualified, preferably to degree level or equivalent, and must have a knowledge of COBOL. Starting salary will depend on qualifications, experience and age.

Application forms and further details may be obtained from The City Treasurer, The Council House, Corporation Street, Derby DE1 2FE (Derby 31111 ext 818 or 828). Closing date - August 31st, 1978

## ANALYST/ PROGRAMMER RETAILING

An experienced PLAN/COBOL Programmer with some knowledge of systems analysis is required for our city centre ICL 2903 computer installation utilising magnetic tape, EDS 80s and Key Edit data entry.

Salary will relate to experience and qualifications.

Conditions of employment are attractive and include contributory pension fund (additional to State Scheme), four weeks' holiday after first year, staff discount scheme and sports and social club facilities.

Applications in writing to:

Manpower Planning Manager  
Birmingham Co-operative  
Society Ltd.  
Personnel Services Division  
7th Floor, King Edward House  
136A New Street  
Birmingham B2 4DL

## UNIVERSITY OF LIVERPOOL COMPUTER LABORATORY

Applications are invited for posts in the following areas:

**MICROPROCESSOR  
HARDWARE  
MICROPROCESSOR  
SOFTWARE  
GRAPHICS  
CAMPUS NETWORKS  
GANNET GEORGE 4  
DATA CAPTURE AND  
ANALYSIS  
OPERATIONS  
CO-ORDINATION**

Appointments will be made on the following scales (under review):

Programmer/Analyst £3680-£5282  
Senior Programmer/Analyst £5282-£6178  
Principal Programmer/Analyst £6178-£7308  
and initial grade and salary will be determined according to qualifications and relevant experience.

A degree in Computer Science or numerate discipline is normally required. The Data Capture and Analysis post is suitable for a candidate with a background in economics or the social sciences. It is unlikely that appointments to the two posts concerned with Microprocessors will be made at less than Senior Programmer/Analyst level.

Application forms and further particulars may be obtained from The Registrar, The University, P.O. Box 147, Liverpool L69 3BX.

The closing date for the receipt of applications is 15 September, 1978 and it is expected to hold interviews towards the end of September. Quote Ref: RV/B91/CW.

## SEENA (UK LTD.) SOFTWARE/PROGRAMMER

SEENA (UK LTD.) REQUIRE A SOFTWARE PROGRAMMER FOR A 16-BIT MACHINE, WORKING ON EXCITING REAL-TIME PROJECTS. Salary £7,000 plus usual perks. Working in a happy atmosphere with a small, friendly staff.

Write to: Mr. A. E. P. Turner  
SEENA (UK LTD.)  
13 HERMATADE PARADE  
ABCOY, BERKS  
or Telephone: Aspet 218 88/9

## DATSUN

## ANALYSTS ANALYST/PROGRAMMERS PROGRAMMERS

We are replacing our IBM 370/125 with a 370/148 in September this year to enable us to expand our existing systems and develop the following:-

- PARTS DATABASE
- ON-LINE (AUDIO-RESPONSE) ORDER ENTRY
- DEALER ACCOUNTING SYSTEMS
- DISTRIBUTED PROCESSING
- SATELLITE LINK TO JAPAN

Our principal tools for this development will be:-

- DOS/VS UNDER VM
- CICS
- DL/1
- COBOL WITH ON-LINE PROGRAM DEVELOPMENT

If you are an experienced DP professional attracted to this challenging environment we can offer:-

- Salaries according to experience
- Benefits include - Non-contributory Pension

Scheme, Subsidised Restaurant, Preferential Discount on Staff Purchases

Our working conditions are excellent, with good Company relations.

Apply directly in writing, or by telephone for application form to:-

Personnel Department  
**DATSUN U.K. LIMITED**  
New Road, Durrington  
Worthing, Sussex  
Tel: Worthing 68561



# We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

**Personal** Please write in ballpoint, using block capitals.

Surname \_\_\_\_\_ Forenames \_\_\_\_\_

Address \_\_\_\_\_

Tel. Home \_\_\_\_\_ Office (discretion will be used) \_\_\_\_\_

Age \_\_\_\_\_ Place of Birth \_\_\_\_\_ Car? \_\_\_\_\_

Are you prepared to relocate? \_\_\_\_\_ UK/Abroad (delete) \_\_\_\_\_

**Experience** Place no. of yrs. in box, e.g. IBM 360/370 ☒ 4

**Machines:** Please specify model. Applications

IBM 360/370 ☐ Commercial ☐

IBM others (specify) ☐ Financial ☐

ICL 1900/2900 ☐ Payroll ☐

ICL others (specify) ☐ Production control ☐

Honeywell ☐ Stock control ☐

Univac ☐ Scientific ☐

Burroughs ☐ Realtime ☐

PDP ☐ Software ☐

Other mainframes (specify) ☐ Database ☐

Other mini-computers (specify) ☐ Message switching ☐

Communications ☐

Other mini-computers (specify) ☐ Data transmission ☐

Central process ☐

Teleprocessing ☐

Other mini-computers (specify) ☐ MIS/CPA/PERT ☐

Magnetic tape ☐

Other mini-computers (specify) ☐ Disk ☐

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## COMPUTER OPERATORS

2-SHIFT  
£4,500 LONDON

Conoco, one of the major international oil and energy groups, is actively involved in North Sea Exploration, as well as having refinery and marketing operations in Europe.

Due to expansion of operations, and internal promotion, our London Data Centre, situated in the West End, now needs to recruit two Operators, male or female, to join our existing team of 6 working on a two shift cycle Monday to Friday.

Our current configuration consists of an IBM 370/135 running under DOS/VS; GRASP/VS with 3340 disks and 3420 tapes. Future plans are to upgrade to a 3031 under MVS and introduce on-line processing using the CICS monitor.

Ideally you should have a minimum of 12-18 months experience on an IBM 370 system and have a sound knowledge of DOS/VS concepts, JCL and utilities.

Career progression for the right candidates are excellent both in the Computer Operations, and into the development area; the company operates a comprehensive training scheme.

Company benefits include free staff restaurant; non-contributory pension scheme; season ticket loan scheme and active sports and social club.

We will be interviewing over the next two weeks, so if you're interested ring Bob Bruce now on 01-493 1235, or write to him at the address below.

Continental Oil Company Limited,  
Park House, 116 Park Street,  
London W1Y 4NN.

## LONDON BOROUGH OF BROMLEY COMPUTER OPERATOR

(REF. B.308)  
CL 1 Salary up to £3,684 (Bar at £3,180) Plus Shift Allowance

A vacancy exists for a Computer Operator in our 1903T installation running on line VDU and MOP terminals and batch processing under the George 3 operating system.

Applicants need not necessarily be experienced as training would be considered for otherwise suitable applicants.

Five G.C.E. 'O' level passes including Maths and English are necessary and success in an aptitude test for trainees.

Progression beyond CL 180 is dependent upon undertaking supervisory and/or more responsible duties and is subject to the efficiency of the officer. Shift working involved, for which payment of a 14% shift allowance is made of basic salary plus £105 Starting salary according to age and experience.

Closing date 1st September, 1978.

Application forms from Assistant Chief Executive (Manpower), Town Hall, Bromley BR1 1BB. Tel. 01-464 3333. Extension 3318.

## UNIVERSITY OF NOTTINGHAM CRIPPE COMPUTING CENTRE NUMERICAL METHODS SPECIALIST

A specialist in numerical methods is required to join an existing team whose responsibilities include liaison with research workers in the University, and the provision of an advanced numerical and statistical facilities on the Centre's linked ICL 1904S and 1906A systems. The team also liaises closely with similar teams in other universities and contributes to the NAG library. Experience of scientific programming languages, preferably Algol or Fortran, is required. Salary up to £4,800 per annum. Applications should be sent to the Staff Appointments Office, University of Nottingham, University Park, Nottingham NG7 2RD, returnable not later than 31st August, 1978. Ref. No. 021.

P.W.S. is a well-established Lloyd's broking company, based in London, handling a large portfolio of International Reinsurance business.

## SYSTEMS ANALYST SENIOR PROGRAMMER PROGRAMMER

If you want a position with both challenge and interest, then P.W.S. have some exciting opportunities to offer.

Using a new 384K Honeywell 64/20, you will be involved in the complete re-design of our complex systems around the latest Database software.

We should like to hear from people with a minimum of 2 years' COBOL experience, who could cope with tough targets and justify the attractive salaries, generous fringe benefits and relocation expenses offered.

Please write with brief details to John Ross at the following address.

**PWS**  
PEARSON WEBB SPRINGBETT LTD.  
The Quadrangle  
Imperial Square  
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Glos. GL50 1TD

## BECOME AN EDITOR! COME TO BRUSSELS, BELGIUM

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If you are a young engineer with a good overall technical education, if you like to write, and are also able to communicate in German and/or French, an interesting job and an attractive salary are awaiting you. Your background should enable you to write for and to share editorial responsibility for new or revised publications. If you can imagine yourself in this position, please write enclosing CV to:

14th Floor, Crown House,  
London Road, Morden, Surrey

**PROGRAMMER**

3 years' Cobol experience

Full or part-time

Excellent salary

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## Programmer

Based at Broadway, London SW1  
£5108-£5435

Involving much more than just coding, this position will appeal to a programmer who enjoys working on his or her own initiative.

As a member of a small team, the successful applicant will convert existing systems to an in-house mainframe, develop new systems, and provide advice and assistance to users of the Authority's MOP service.

Current computer facilities include interactive terminals connecting to time sharing bureaux and the Authority's ICL 1900 system (1904S with 192k of core and 1,000 Mch of disk storage) and a CMC 5200 used as an RJE terminal to the Authority's IBM 370 system (twin 370/148 with 36,000 mbytes of on-line storage).

Applicants should have several years' experience, including George 3 and Cobol or QPAC and MKIV, and a desire to extend this experience. The post is based in Westminster and offers attractive Conditions of Service, including generous annual leave entitlement.

For an application form, please write to the Personal Branch, 50-64 Broadway, London SW1H 0DB (Tel. 01-930 0754).

Closing date 31st August, 1978

## Thames Water

## OS CONVERSION — AMSTERDAM

£250 p.w.

We have an urgent requirement for operations staff to assist with an IBM 370 DOS to OS Systems conversion.

Applicants must have a thorough knowledge of OS VSI, JCL, and utilities. Conversion experience will be preferred. Successful applicants will help to train the client's staff.

Salary will be in the range of £200-£250 p.w. Long contracts will be offered.

Please telephone Denise Rees at:  
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## I.L.E.A.

SOUTH THAMES COLLEGE  
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DEPARTMENT OF MANAGEMENT SERVICES & COMPUTING

require urgently

## PART-TIME DAY/ EVENING LECTURES

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or Telephone: 01-870 2241 Ext. 238/8

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# data scene

## CONTRACTS

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We have immediate requirements for Analyst/Programmers with solid experience in Coral 66 and Real Time systems. Candidates able to offer knowledge of PDP 11s using RSX11M operating system will be given preference but this is by no means essential. Contracts are expected to run between 8 and 9 months.

### BASIC + RSTS/E — LONDON & HOME COUNTIES

We are currently searching for Programmers, Analysts and Consultants to make up numerous teams to work on different development and conversion projects for various clients, incorporating a vast range of commercial applications. It is anticipated that contracts will be for 3 to 12 months in duration.

### PDP 11 — CITY

Your client is currently seeking two first-class Analyst/Programmers to take two banking and investment systems from design to implementation. Candidates are likely to have at least three years' experience, of which at least 12 months will have been spent with DEC hardware. There are long-term contracts with an anticipated running length of 18-24 months.

The same client has a third contract available for a DEC orientated Systems Programmer with a sound knowledge of RSX11 for months.

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## IMI SUMMERFIELD

# Computer Programmer

IMI Summerfield, a member of the IMI Group, carries out research into and development of solid propellant rocket motors. It is situated in a rural part of Worcestershire about two miles south of Kidderminster.

A vacancy has arisen for a Computer Programmer in the Computer Section of the Rocket Motor Design and Development Department. The duties involve mainly programming together with some systems analysis of a wide variety of scientific projects. Applicants will preferably be qualified to a minimum of Higher National Certificate, together with experience of programming and/or systems analysis in a scientific

environment. The preferred programming language is Fortran 4. Candidates having, in addition, some knowledge and experience of using an assembler language may find this to their advantage.

Employment conditions include a Profit Sharing Scheme, up to 23 days annual holiday and a contributory Pension Fund.

Applications in writing from men and women quoting reference number 15778/GFT should be sent to: The Personnel Officer (Staff), IMI Summerfield, Kidderminster, Worcestershire, DY11 7BZ. Telephone: Kidderminster 4061.



CHELSEA COLLEGE  
University of London

### SENIOR COMPUTER OPERATOR

An experienced person is required to join a small operations group currently working two shifts in a time-shared multiple access environment. Minimum qualifications required are O-level Mathematics and English together with a good understanding of software and operating systems, and at least two years' operating experience.

The post is permanent, five-day week, four weeks holiday.

Safety in the range £3615-£4248 inclusive of London Allowance and Supplements.

The College runs an Elliot 4130 main computer, with batch and 18 users multiple access terminals, soon to be supplemented by a powerful new 16 user time-sharing minicomputer. A Nova 1220 completes the network, which is controlled by a Quidel PACS data communications unit with links to the University network.

Applications and further details from the Secretary, Computer Centre, Chelsea College, Fulham Place, Fulham, London, SW3. Telephone 728 1244.

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## Systems Analysis & Programming

in a manufacturing environment

Rank Xerox Manufacturing Group in Welwyn Garden City utilises some of the most advanced engineering techniques in the production of a wide range of electronic assemblies and special materials.

Our small, but professional computer department develops and supports local on-line and batch systems. Hardware is PDP 11/34's for on-line systems and batch and time sharing links to large Rank Xerox Honeywell and IBM datacentres. Systems are written in COBOL, BASIC + and APL.

We now require Analysts and Programmers to help us extend our systems coverage into new functions and areas and become involved with a variety of applications aimed at improving our manufacturing performance. Increasing emphasis is being placed on the development of on-line systems for stores and shop floor operations.

Current vacancies are for

### Analysts

with at least 2 years' systems experience and some expertise of manufacturing, production control and/or finance systems

### Analyst/Programmers

with at least 2 years' COBOL or BASIC + experience with a desire to move towards Systems Analysis

Salaries are competitive and generous benefits include excellent pension, life assurance and sickness benefit schemes, relocation expenses, 4 weeks holiday, rising to 5, subsidised staff restaurant and active sports and social club.

So, if you've got the enthusiasm to learn new skills and want a job with real involvement in a stimulating environment, Andy Kennedy or Peter Braithwaite now on Welwyn Garden City 23434 ext. 3348 or write to either of them at Rank Xerox Limited, Bessemer Road, Welwyn Garden City, Herts

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NEEDS

## DATAPoint-EXPERIENCED PERSONNEL

We utilise both 5500 and 6800 configurations within Europe to meet our data processing requirements, and as part of our planned expansion we now wish to recruit a selection of appropriately qualified specialists.

If you are either a project leader, applications programmer or systems programmer, and feel you would be interested in working with us in our European Centre situated in the West Midlands, why not make a reverse charge phone call to Roger Moore on 021-707 1295 to find out more. Should this not be convenient for you, then send me your curriculum vitae or write for an application form to National Chemsearch (UK) Ltd., Swan Office Centre, 1508 Coventry Road, Birmingham B25 8BL, marked "Confidential" — EDP.

## Consultancy in Manchester

Leading Programmers to £5,400 + Benefits  
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Fraser Williams (Manchester) Ltd provides Consultancy services to a broad spectrum of existing and potential computer users in the North West.

Current development projects in Commercial, Industrial, Scientific and Governmental organisations have created several vacancies for Programmers and Analysts.

Candidates should be able to produce evidence of their ability, and particular hardware or software expertise is less important than a sound educational background and a desire to develop a career in a challenging and varied environment.

Good salaries linked to a share of profits, together with business expenses ensure a high level of earnings.

Contact Derek N. Hartley — Systems and Programming Manager.

Call 061-872 8428, reversing charges, anytime each weekday to 7.00pm, up to Wednesday 23rd August.

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Fraser Williams

## Senior Analyst

Applications are invited for the post of Senior Analyst in the Computing Services Department. The successful candidate (male/female) will be responsible for the systems required by the Administration (e.g. Student Records System).

The Polytechnic has recently installed a DEC-20 to replace a 1906E and the Administration programme are currently being converted. This post will require a good working knowledge of COBOL, preferably gained on DEC 10 or DEC 20 systems. However, knowledge of ICL 1800 COBOL or RPD2 would also be an advantage. It is unlikely that an applicant who has worked for less than three years with COBOL would be considered sufficiently qualified.

Salary: APS — £4481-£4761 plus supplement of £312 p.a.

Further details and form of application available from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date, 6th September, 1978.

TRENT  
POLYTECHNIC  
NOTTINGHAM

## SHIFT MANAGER

SALARY £4421-£5528  
An additional shift premium of 20% will be paid

The Regional Computer Unit will be introducing a third shift during October, 1978.

An ICL 1803T under George 3 and a CTL Modular One network are currently in use.

A wide range of computer applications are processed covering both commercial and medical activities.

The post of Shift Manager will probably suit experienced Computer Room Shift Leaders or Data Control Supervisors, with a good knowledge of OS, who wish to broaden their supervisory and management skills.

The Shift Manager will be responsible for all activities within the Computer Room during normal working hours, and will assume responsibility for Data Control and Data Preparation during evening and night shifts provided that the Managers of these sections are not present.

Further information may be obtained from Mr. Bob White, Operations Manager — Oxford 54861 Ext. 564.

Application forms and further details from (Quoting Ref. 77778) The Recruitment Officer, Oxford Regional Health Authority, Old Road, Headington, Oxford OX3 7LP. Tel. Oxford (0865) 54861 Ext. 255/257.

Closing date: 31st August, 1978.

Oxford Regional Health Authority

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Telecomputing continues to develop TPS as the outstanding tp monitor for the ICL range. We are now planning our new software for VME/B, VME/K, and for Intelligent terminals. We got it right with TPS — now is the time to join the small team who will develop and support another winner.

## Project Managers and Consultants

Must have extensive experience in the design and development of online transaction processing systems.

Telecomputing specialises in implementing advanced systems using communications terminals. We operate internationally with every client bringing his own unique system requirements and we need the senior staff to design and develop those systems.

## Applications Design and Programming

Our client services teams continue to expand to meet the growing demand for our software product and project services. We need more experienced programmers and systems analysts/designers. Junior vacancies require at least one year ICL Cobol experience; in more senior positions your specific computer background is less important. All our work is for online systems but you can learn that after you join us.

Our teams have already implemented applications such as order entry systems, production engineering, stock controls and mail order. More are in the pipeline. There are opportunities at all levels. Continuous training will develop your skills and promote your career growth.

## Recruiting Manager

To recruit compute, systems and programming staff for Telecomputing and for our clients. All our clients are implementing advanced systems using communications terminals and need the staff to design and develop those systems. We are seeking an experienced computer recruitment officer or someone with general computer experience plus the personal qualities and motivation to handle client recruitment assignments. Flexible hours could be considered provided this includes the ability to interview applicants out of conventional working hours.

## Lecturer (Commercial D.P.)

To join a small team providing formal training to our clients. We require an established lecturer in computer disciplines or experienced computer programmer with lecturing skills and strong training motivation. You will not spend all your time lecturing. You will have the opportunity to keep abreast of the latest developments by spending part of your time working with the applications, design and programming staff.

## Software Sales

To sell TPS — the leading software product for ICL communications systems. We are currently taking one order every three working days and need additional Sales Staff to respond to the tremendous demand for TPS and other Telecomputing quality software products. Computer experience and sales motivation are essential; experience of terminal systems and of software marketing are useful but not mandatory. Ideally we would like to meet system designers and programmers who have either moved or wish to move into sales.

Telecomputing started in Oxford in 1974 and has more than doubled in size each year. We are now providing advisory, training and implementation services for installing online computer systems around the world.

We have our own 2904 and a 2950 on order. Our activities are continuing to expand and we shall soon announce a microcomputer display terminal. This year we shall double in size again.

When you join Telecomputing you are taking the opportunity to develop your own career in a growth company. We have an informal atmosphere and expect to pay attractive salaries and bonus.

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Salary £6000—£9000

To advise clients and ensure that their problems are resolved with the best available solutions and to work with them to a successful conclusion.

## COMMUNICATIONS SOFTWARE CONSULTANTS:

Salary £6000—£9000

To advise clients on their data communications requirements and work with them—independently and alongside the various other divisions of Control Data—in developing and implementing the most suitable hardware/software solution.

## SYSTEMS SOFTWARE ANALYSTS:

Salary £5000—£7000

To work in pre-/post-sales environments with Control Data's Cyber 170 operating systems, particularly NOS/BE.

## SCIENTIFIC APPLICATIONS ANALYSTS:

Salary £5000—£7000

To provide customer and sales support for Engineering and Management applications such as:— Civil/Structural/Mechanical engineering; Pipe Stress Analysis; Linear Programming; Financial Modelling; Statistics; Project Planning/Control; Graphics (both passive and interactive).

## COMMERCIAL APPLICATIONS ANALYSTS:

Salary £5000—£7000

To work in a sales and customer support capacity on such applications as:— Sales/Purchases/Nominal ledgers; Stock/Production Control; Payroll; Data Bases; Financial Systems.

## NETWORK COMMUNICATIONS ANALYSTS:

Salary £5000—£7000

To provide support to the Communications Consultants in analysis, programming and implementation of software on Data Communication Networks.

## MINI/MICRO SOFTWARE SPECIALISTS:

Salary £5000—£7000

To design and implement mini/micro system based applications, both stand alone and computer network oriented.

## PROGRAMMERS:

Salaries range from £3500 for Trainees to £7000 for Chief Programmers/Team Leaders.

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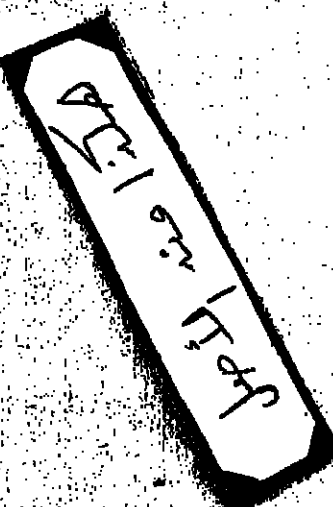
We offer large company benefits including re-location expenses where relevant and the possibility of travel.

For further information contact Bruce Jones or Sylvia Nuth at 79 Wells Street, London, W.1. Tel: 01-637 0176.

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then, we can offer you a choice of challenging positions.

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## Programmers

### Geophysical Division

We require programmers for vacancies in our Geophysical Division in London and our Geophysics Research Branch at Sunbury-on-Thames. This latter Branch is expected to relocate to London within the next twelve months.

In London the work, involving the use of both Fortran and Assembler, consists of developing and maintaining new and existing software for processing seismic data. We have two Texas Instruments TIMAP systems which are dedicated to seismic processing and our programmers work in close liaison with the Geophysicists using this system.

In Sunbury the programmers assist Research Geophysicists in the design, development and application of data enhancement techniques in seismic prospecting. The work will be concerned with a general purpose system (UNIVAC 1110) and the TIMAP systems.

We are seeking applicants with at least two years' programming experience, preferably with a seismic system. A degree or equivalent in Maths, Physics or Computer Science would be a definite advantage.

Our current salary levels together with a non-contributory pension scheme, subsidised lunches and excellent sports and social facilities now represent outstanding conditions of employment.

Please write giving brief details of age, qualifications and experience, quoting reference FY 581, to The Manager, Central Recruitment, The British Petroleum Company Limited, Britannic House, Moor Lane, London EC2Y 8BU.

## Systems Engineers Switzerland c. £18,000 p.a.

Are you a Systems Engineer who's looking for a job that's a little bit different? A job which is secure and yet offers challenge, variety, a wide range of equipment, and international connections? Read on—we've got what you want.

Itel is one of the world's largest suppliers of IBM-compatible mainframes, marketing and maintaining a wide range of products throughout Europe, the United States, Africa and the Middle East. As a result of our continuing expansion, we are now seeking two additional Systems Engineers for our Swiss operation: one to be based in Bern, and the other in Zurich. In each case, after one year's service the job-holder will be given the option of relocating elsewhere in Europe.

Candidates should have experience of IBM large systems, and should be prepared to offer both pre and post sales technical assistance to the marketing staff when required. In addition, they should be able to rectify problems which occur in as many of the following operating systems as possible: OS, VS/1, SVS, MVS, JES2, JES3, HASP.

This is an unusual opportunity to join an expanding international company where job interest is high, and where salary plus benefits reflect your status as an expert. Why not find out more? Send a CV or make a reverse-charge phone call to Barry Martin, Itel International (Europe) Corporation, Bowater House, 68 Knightsbridge, London SW1. Tel: 584 5050.

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Data Processing Recruitment Consultants

## Analysts+Programmers Manchester

Salaries: c. £5 - 9K

Our client is a major international company recognised as market leaders in their field and has retained Logistix to assist in recruiting the following Key project-team specialists: Real-time mini programmers, Data base designers, compiler specialists, communications experts (Mini and Mainframe) Application and Software programmers. Experience of any of the following will be especially welcome: RSX-11, RTL11, BASIC, ASSEMBLER, PL/1, COBOL, IMS and

D.B. For those who enjoy overseas travel there will be ample opportunity to visit European and Middle-East locations at which our clients have offices. Successful applicants are likely to demonstrate qualities of leadership potential, determination and be self-starters. It is anticipated that you will achieve very rapid promotion within this prestigious company. Interviews will be held in Cheshire during August and offers will be made before month's end.

## IBM Contracts E.E.C.

Rates: £9 - 13 per hour + overtime

We have urgent requirements for clients in Holland, Switzerland and France seeking candidates who are either available now or in the near future. A minimum of 2 years solid IBM main-frame experience is a pre-requisite. The following are just some of the openings currently available:  
\*DOS/VS programmers with DL/1 Holland  
\*IMS DB/DC programmers O.S. Holland  
\*IMS DB/DC Systems programmers Switzerland

\*IMS DB/DC Analyst programmers Switzerland  
\*IMS DB/DC Analyst programmers Paris  
A sound knowledge of either COBOL or PL/1 is essential for programmers and Assembler in the case of Systems programmers. Contracts range in duration from 8 weeks to 9 months but only those available within the next three weeks can be considered for these posts at this time.

## Systems Engineers+Programmers Brussels+Thames Valley

Salaries: to £15K (E.E.C.) £9K (U.K.)

An internationally respected supplier of Data Base and Teleprocessing Management Systems requires for its Belgian and U.K. operations several Systems Engineers and Programmers up to consultant level. You should have current experience in the implementation and support of Data Base and/or Real Time Systems. In particular exposure to any of the following — IMS, CICS, TOTAL, ENVIRON, TASKMASTER, SHADOW or ADABAS is highly relevant. Candidates for the Brussels positions should ideally (although not essentially) have some

French language ability. Additionally, there is a requirement for the U.K. based staff to travel within this country and occasionally to E.E.C. Supplemental to a high salary, you will receive extensive benefits including full relocation expenses, life and disability insurance, pension plan, overseas allowances and liberal mileage allowances. Above all, these positions carry excellent prospects. Interviews will take place within fourteen days of the appearance of this advertisement.

## Honeywell Level 66 Benelux

Salary Range: £12 - 16K

Our client is major international Hardware and Software Systems supplier currently developing new systems in a multi Honeywell Level 66 environment. We invite applications from Senior Programmers, Analysts/Programmers and Systems Designers who have had a minimum of two years continuous experience in one or more of the above capacities on Level 66 hardware. Candidates should preferably have had exposure to GCOS, IDS ISP or TDS, whilst the programming languages used are primarily COBOL and

occasionally FORTRAN. Specific applications experience is not regarded as essential. In the first instance you will be offered a full relocation package under a one year's (renewable) contract. On completion you will be offered an opportunity to relocate to one of the company's several European locations. These outstanding vacancies will be filled towards the end of October whilst interviews will be conducted at our offices in early September.

## Micro or Mini Specialists London+Home Counties

Salaries £5 - 9.5K + Overseas Travel

Candidates should possess a minimum of one year's practical involvement in applications or software design and development in either a computer manufacturing or Systems House environment. Those who have Assembler language experience on Mini or Micro Computers particularly DEC PDP 11, DG NOVA/ECLIPSE and TI 900/9900 or specific

Micro-Processors preferably Intel 8080/5, Zilog Z80 or Motorola 6800 will be ideally suited. In addition to an above market starting salary our clients offer excellent career advancement prospects and the opportunity to travel within Western Europe. Initial interviews on our clients' premises will be held before the end of August.

Logistix, Freepost 32, London W1E 3YZ  
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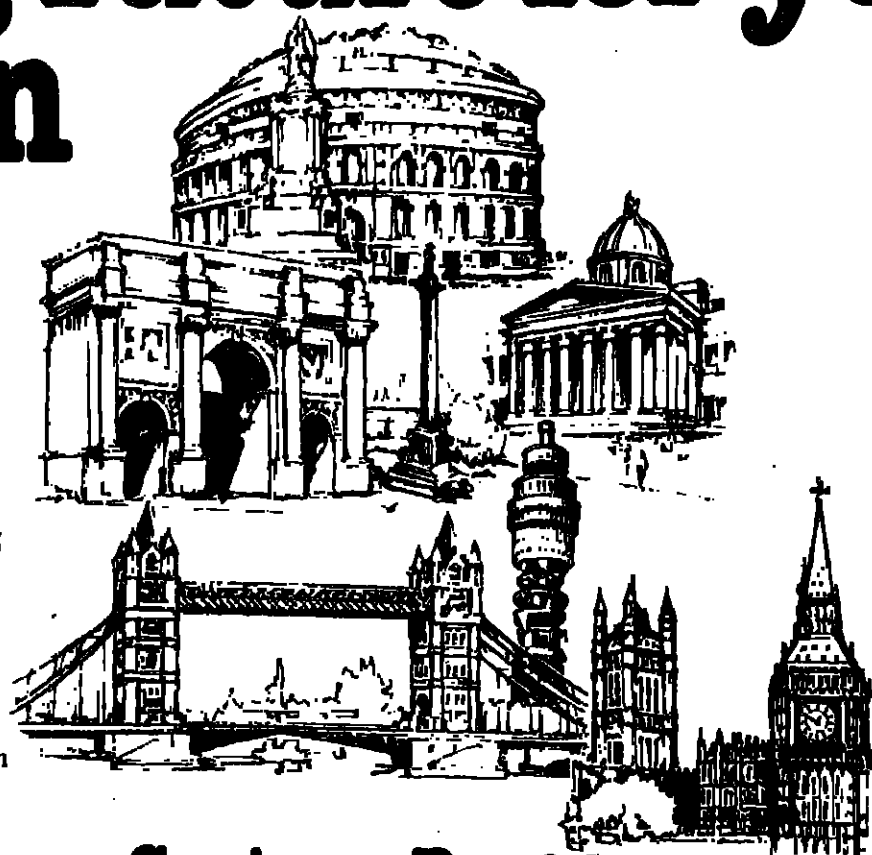
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## Systems Programmers £4819-£6643

At least 2 years experience of IBM software—and able to work in a team. You will be working with a specialist team generating, developing and maintaining OS/VSI, CRJE, CICS, RES, DL/I, ATMS/STAIRS, MVS, ADABAS, IPS, PLANCODE, ICES & MOSS.

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At least 2 years IBM experience, including designing, specifying and writing programs. Knowledge of BAL or PL/I or FORTRAN is essential and experience of teleprocessing systems would be an advantage.

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- Contact Corinna Furse (01-633 3035) for an application form, or write to her at Central Computer Services, Greater London Council, Room 296, County Hall, London SE1 7PB

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### UNIVERSITY OF EDINBURGH DEPARTMENT OF ARTIFICIAL INTELLIGENCE RESEARCH ASSOCIATE (SYSTEMS/ APPLICATIONS PROGRAMMER)

A Research Associate (systems/applications programmer) is required to support the Department's interdisciplinary postgraduate teaching and research programme. Duties will include implementing, documenting and maintaining interactive list processing programming languages on the Department's DEC PDP-11-40 computer, under UNIX, and developing applications software packages for use by members of the academic staff. Applicants should have a degree or equivalent qualification, in computer science or a related subject. Previous experience with DEC PDP-11 computer would be an advantage. Salary will be at an appropriate point on the Range 1A scale £3,860-£6,178 according to age, qualifications and experience.

Further particulars may be obtained from Dr. Hume, Department of Artificial Intelligence, University of Edinburgh, Forrest Hill, Forrest Road, Edinburgh EH1 2QL, with whom applications, together with the names and addresses of two referees, should be lodged not later than 15th September 1978. Please quote reference 5043.

### UNIVERSITY OF NOTTINGHAM Department of Psychology

#### Experimental Officer (Computing)

Applications are invited for this recently-created post which requires someone with software experience to provide and develop systems resources for our PDP-11 machines. The maintenance of documentation and system software and the provision of advice and assistance on programming problems would also be important duties. The Department has a multi-processor PDP-11/34 machine running RT-11 and UNIX, and satellite GT-40 and IS-11 machines for laboratory applications. Candidates should have a degree in an appropriate discipline and have experience in scientific and laboratory computing.

Salary will be on the scale 1B £3,180 to £4,801 p.a. (under review) according to age, qualifications and experience. Further particulars may be obtained from the Staff Appointment Officer, University of Nottingham, Forms of application should be returned by September 4th 1978. Ref No. 024.

### TEESSIDE POLYTECHNIC COMPUTER CENTRE

#### PROGRAMMER ANALYSTS (4 Posts)

The Computer Centre provides a service to the whole Polytechnic and has just installed a large Univac computer. A wide range of programming is undertaken, including systems programming and the development of applications software for the academic department, the Library and the Administration. Programmer Analysts should normally be graduates or equivalent educational standard and preferably have two years programming experience. The starting salary will be at an appropriate point on a scale ranging to a maximum of £5,075 p.a.

Application forms and further particulars may be obtained from Assistant Secretary (Academic), Teesside Polytechnic, Cleveland TS1 3BA, to whom they should be returned as soon as possible.

## Satellite Hardware Checkout Systems Netherlands £10,000 +

Logica offers permanent staff positions for analysts and programmers to work on the development of satellite hardware checkout systems in the Netherlands.

You should have experience of high level language real-time programming on minicomputers. Knowledge of CORAL and Modular One experience would be particularly useful.

You should be keen to live in the Netherlands and work in an international agency in which English is the working language. Assignments will be for a minimum of one year with possible extension.

Total earnings for candidates with suitable experience will be from around £10,000.

Call Paula Freed on 01-637 9111 or write to her for an application form—Ref. CGR/H. Logica Limited, 64 Newman Street, London W1A 4SE.

If you're good, we can help you go further

logica

## Software Support Analyst Saudi Arabia £10,000 tax free

Software Support Analyst to manage a Prime 300 system in Saudi Arabia. An outstanding person with a knowledge of PRIMOS and FORTRAN who will make a creative contribution to our software, adapting the system from engineering disciplines to newly identified market-needs in commercial applications such as payroll, inventories etc. In addition to a salary of £10,000 tax free, you will receive accommodation with a two year contract and 15 days leave every 15 weeks. Interested candidates should write immediately (confidentiality is guaranteed) to the Manager International Distributor Operations, Box no 1976, Computer Weekly.

### Contracts

## EXPERIENCED FREELANCERS AND NEWCOMERS

If you have the following:  
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PDP/11 MUMPS  
CORAL 66  
IBM IMS

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We also have a limited number of vacancies for graduates with 6-18 months experience.

### THE UNIVERSITY OF SHEFFIELD DEPARTMENT OF ARCHITECTURE

Applications are invited from men and women for a post of

#### COMPUTER PROGRAMMER

to work on the development of interactive programs for a project which is evaluating the use of computer aided design in architectural practice supported by the S.R.C. Salary £2100 p.a. Further details from and applications to Dr. B. H. Lawton, Department of Architecture, The University, Sheffield S10 2TN by 1 September 1978. quoting ref. H100/88

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# CONTRACTS

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## OPERATORS

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Contract: Permanent/other .....	Contract: Permanent/other .....	
Notice Required / Date Available (date/s) .....		Second Choice .....
Areas Preferred: First Choice .....	Hardware .....	
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You will possess good communicative skills in addition to solid background in Computer Operations. A mini computer background would be ideal but other experience, particularly IBM 370, would be considered. Reporting to the European Technical Services Manager, you should possess some expertise in Teleprocessing.

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Please reply quoting ref. GD 1500

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Operations staff usually get the thin end of the wedge from most Recruitment Companies, but we at Span take the trouble to listen to your requirements before we act on your behalf.

Please telephone me, Glen Donnelly, so that I may be of some assistance to your search for a new position.

#### CONTRACT OPERATORS

We have many positions coming available in the near future please telephone for further details.

### UNIVERSITY OF EXETER FACULTY OF SOCIAL STUDIES PROGRAMMER III

The Data Processing Unit in the Faculty of Social Studies requires a Programmer III to join a team of four programmers. The Unit has an RJE link to the University ICL 472 computer.

The work is mainly of a statistical nature in the creation and analysis of data banks and preference will be given to applicants with experience of programming in a statistical language and the use of statistical packages. Applicants must have a university degree in a relevant subject but previous computing experience is not necessary as training will be given.

Salary according to qualifications and experience will be within the range £3069-£3604 p.a.

Letters of application stating the name of two referees should be sent to: Miss Doreen Weston, Applications, University of Exeter, House, Quatre Drive, Exeter, Devon, EX4 4JF. Please quote ref. 852.

## SYSTEMS ANALYST £4750-£5250 NORTHAMPTON

We require a systems analyst to participate in systems development in existing and new design areas for our on line real time system consisting of a B3700 and a nationwide data communications network with 40+ remote terminals.

Applicants with a programming background should have 18 months commercial systems experience (preferably involving on line or data base work).

Relocation assistance will be available if necessary.

Please send career details to Martin Jones, Robert Home and Coy Ltd., Huntsman House, Mansion Close, Moulton Park, Northampton.



# ANALYSTS AND PROGRAMMERS

LOCAL INTERVIEWS FOR LOCAL JOBS.

## LEEDS

**Systems Analysts** c.£5500  
Major opportunity in a progressive company. These are ground floor appointments in a new installation and new systems under development will include on-line, real-time and distributed processing.

(C/78071)

**Programmers** from £5000  
COBOL programmers also required and positions and salary will depend on qualifications and experience of the successful candidates.

(C/78072)

## NEWCASTLE

**Senior Analysts** c.£6000  
Major industrial company wished to recruit additional senior systems analysts. Experience in a commercial installation is essential as is a good business background.

(C/78073)

**Principal Programmer** c.£6250  
Minimum of 7 years experience of COBOL and ASSEMBLER. Experience of all types of file handling, database and CICS. Previous supervisory experience leading more than one applications team an advantage.

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**Senior Systems Programmer** to £6500  
Progressive IBM installation needs Team Leader in its Software section. D0S, CICS, DBOMP, or DL/1 required.

(C/78069)

**Systems Programmer** c.£5000  
A young Systems Programmer is also required for a position in the support team. IBM experience essential although not in as much depth as for the senior position.

(C/78070)

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**Ivor Norton Management Services Ltd**

P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628.

## FORTRAN PROGRAMMERS

**West End** £3750 to £5800

If you are a programmer with 12 months' or more FORTRAN experience and can see little hope of career advancement in the near future, then perhaps you ought to consider a move. An opportunity has arisen for a competent and ambitious programmer to join a large manufacturing company and so gain valuable experience in Financial Modelling and Systems Analysis on either IBM or ICL mainframes (they have both). If you also like the prospect of a Non-Contributory Pension, Season Ticket Loans, subsidised restaurant, and cheap company products, then telephone at once.

Reference PG 33/1

## REAL TIME PROGRAMMERS

**Central London** £4000 to £8000

One of this country's most respected software houses has a number of opportunities in their Real Time Systems Division based in Central London. Positions exist at all levels from Programmers & Analysts through to Consultants. Assembler or Fortran experience in any of the following areas: Message Switching, Production Control, Military Systems or Communications, gained on Minis or Micros, would be suitable. An ability to meet and communicate with clients, an outgoing personality and the willingness to pick up new machines and languages is essential. If you believe that you could comply with the above specifications and would like a rewarding position with an excellent salary and prospects, ring us immediately.

Reference PG 33/2

## OPERATIONS

### IBM & ICL

**IBM OPS SUPERVISOR** £8000  
N. London site. Some ICL exp useful. Suit Senior Shift Leader.  
**IBM SHIFT SUPERVISOR** £8000  
C. London. 4 years OS with good JCL. Excellent prospects.  
**IBM SHIFT LEADER** £6800  
C. London. DOS site. Minimum 3 years experience. Good perks.  
**IBM SENIOR OPERATORS** £5300  
C. London. 2 years DOS experience. 3 shifts. 5 days. Good prospects.  
**IBM OPERATORS** £4400  
Minimum 1 years OS experience for various C. London sites.  
**ICL SHIFT LEADER** £4300  
2 shifts only. Minimum 2 years experience on GII.  
**ICL OPERATORS** £4100  
Various sites, head ICL operators with 6 months+ experience.

## BURROUGHS, NCR, UNIVAC, PDP, HONEYWELL

**BURROUGHS OPERATOR** £3600  
C. London site working DAYS ONLY. Any B1700 experience.  
**BURROUGHS OPERATOR** £3600  
W. London site working EVENINGS. Any B1700 experience.  
**BURROUGHS OPERATOR** £6400  
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**NCR JUNIOR OPERATOR** £3300  
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Minimum 18 months OS3 experience for large City based firm.  
**DEC OPERATOR** £4250  
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**HONEYWELL OPERATOR** £4250  
GCOS experience required for large site located in N. London.

## DATA CONTROLLERS

We have many positions, both Junior & Senior, at salaries up to £8000

## PL1 PROGRAMMERS

**West End** to £5500 + Mortgage

A leading commercial organisation with an expanding 370/135 installation in the West End is seeking a number of PL1 programmers to work on a variety of new and existing projects. The positions are ideal for enterprising young programmers with at least twelve months experience on IBM Hardware. A knowledge of OS/VS1, although not essential, would be a distinct advantage.

The company offers a first class salary, and the many generous fringe benefits include Flextime, Season Ticket Loans, and a Subsidised Mortgage.

Reference JC 33/3

## COBOL PROGRAMMERS

**West London** £3000 to £8000

A major manufacturing organisation wishes to recruit additional staff to assist in the implementation of new projects at their West London Computer Centre. They are interested in programmers with all levels of experience to work on a number of new systems which are in various stages of development. All programs are written in COBOL and experience on any major manufacturers' Hardware will be considered, as specialist training will be given where necessary to successful candidates. The company, which has diverse interests throughout industry, offers excellent conditions of employment including free lunches and Life Assurance and the opportunity to develop beyond programming into Analysis and Systems work.

Reference JC 33/4

## ASSISTANT DEVELOPMENT ENGINEER

Data Systems

Newcastle upon Tyne up to £6774

Based in the engineering Division at Regional H.Q., Killingworth, Newcastle upon Tyne.

The Assistant Development Engineer (Data Systems) will become the leader of a small team which is responsible for advising the Engineering Division on the application of computers especially for Grid Control and the communications and instrumentation section.

The team is responsible for the operation and continuing development of a number of IBM System 7 computers which are used for telemetry monitoring and controlling the VHF radio network. The successful applicant will also be responsible for liaison between the Engineering Division and the Region's Computer Services Department.

Applicants should have a degree in engineering, mathematics or computer sciences, and experience of real-time computer applications in the engineering industry.

Salary range £5712-£6774 inclusive of supplements pending pay award.

Application forms, quoting reference E004R, are obtainable from Personnel Division, Northern Gas, PO Box 1GB, Newcastle upon Tyne NE99 1GB, or telephone Newcastle 885882.

Closing date for applications: 25 August, 1978.

**NORTHERN GAS**

Expanding Company would like to acquire an established Software House and or Service Bureau. Preferably within the Home Counties.

Please submit brief history which will be kept strictly confidential to:

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£4,500 Herts.

Everest Double Glazing, a member of the RTZ Group, are manufacturers and distributors of high quality double glazing products with branches throughout Southern England.

Currently our DP Department is expanding its mainframe from IBM system 3 model 12 to model 15D and therefore an operator, with experience of model 15D and CCP, is required.

The successful man or woman will be able to operate the computer without supervision and decompile and distribute all output. Work will be on a rotating shift basis, ie 9.00 a.m. - 5.00 p.m., Monday to Friday, followed by 4.00 p.m. - 2.00 a.m., Monday to Thursday.

The starting salary of £4,500 includes shift allowance and will be reviewed after 6 months. An excellent range of company benefits is offered.



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Please write, with details of experience to date to Mr D. King, DP Manager, Everest Double Glazing Limited, Everest House, Cuffley, Potters Bar, Herts.

## COBOL PROGRAMMERS NORTH WEST

Superb opportunity to join small dynamic team. Excellent salaries and conditions. Interesting, challenging, varied work. Full-time or part-time / Freelance. Telephone: Knutsford 6341-7 or 061-2388751

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**LEE RICHFIELD LIMITED**  
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061-488 0691 day or 061-488 6879 evenings/weekends

## ..Ludbrook.. SOFTWARE OPPORTUNITIES

**SYSTEMS ANALYST** 2 yrs. min. - DEC SFTW House £6-6K  
**PROGRAMMERS** 1 yr. min. - Basic Plus £4-5K  
**PROGRAMMERS** 18 months min. - ICL RPG/Cobol £5K  
**SNR PROGRAMMER** 2 yrs. min. - IBM 370/Cobol £6K  
**OPS. MANAGER** 3-4 yrs. min. - IBM 370/OS VS £6K  
**PROGRAMMERS** 1 yr. min. - ANV - ASS/Cobol £5K  
**SYSTEMS ANALYST** 1 yr. min. - ICL - ANV £5K  
**PROJECT LEADERS** 2 yrs. min. - DEC PDP11 £neg. Staffs  
**PROGRAMMERS** 1 yr. min. - DEC PDP11 £neg. Staffs  
**SENIOR ANALYSTS** 3 yrs. min. - Honeywell Cobol £8K  
**ANALYST PROGRAMMERS** 18 months min. - DEC PDP11 Basic £5K  
**SYSTEMS ANALYST** 2 yrs. min. - ICL 1802 - Cobol £6K  
**PROGRAMMER** 1 yr. min. - ICL 2904 - Cobol £4K  
**CONSULTANTS** 1-2 yrs - All Systems £neg. Birmingham  
**ANALYST PROGRAMMERS** 18 months min. - All Systems - Cobol £5K

**SYSTEMS ANALYSTS** 2 yrs. min. - DEC SFTW House £neg. Leics  
**SYSTEMS PROGRAMMER** 2 yrs. min. - Honeywell Cobol £6K Coventry  
**JNR. PROGRAMMERS** 6 months min. - IBM 370 - Cobol £3-5K Leics  
**ANALYST PROGRAMMERS** 1 yr. min. - IBM 370 - Cobol £5K Leics  
**SYSTEMS ANALYSTS** 3 yrs. min. - ICL R/Time Cobol £6-5K Derby  
**PROJECT PROGS.** 18 months min. - ICL SYS 10 RPG £5K Leics  
**SYSTEMS ANALYSTS** 2-3 yrs. - IBM 360 Cobol £6-5K Peterborough  
**PROGRAMMERS** 18 months min. - IBM 360 Cobol £5K Peterborough  
**REAL TIME PROGRAMMERS** 18 months min. - All Systems £5-5K Leics/Notts  
**REAL TIME SCI. PROGS.** 2 yrs. min. - DEC PDP11 RSX 11M £neg. S/Eng

For details of these and many other posts please contact in the strictest confidence: P. Bell

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## Computer Operator

are required to join a well established Data Processing Department at our Lostock factory. The computer configuration consists of a 512K IBM 370/138 with 3270 on real time systems, 3790 key to Disc and 2790 data collection on line to a system 7. Software used includes DOS/VS, CICS/VS, POWER/VS, D/BOMP, DL/1, VTAM and SPML. Approximately five miles from the centre of Bolton, we enjoy the benefits of a big town with attractive countryside and Lakeland close at hand. Accommodation prices are well below the national average and we will assist with relocation costs where appropriate.

Applications are invited from both sexes and letters of application giving details of qualifications, experience and current salary should be sent to Mr. J. E. Gibbs, Personnel Officer, British Aerospace Dynamics Group, Hatfield/Lostock Division, Lostock, Bolton, Lancashire BL6 4BR.

**BRITISH AEROSPACE DYNAMICS**

لندن من اجل

## IRISH RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on August 24 and will highlight career opportunities in Ireland.

Space reservations should be made as soon as possible to:

Owen Kelly — Manchester — 061-872 4211  
Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

**COMPUTER WEEKLY**  
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Advertisers are reminded that due to Bank Holiday Monday on August 28th, 1978, the copy closing date for the above issue will be 5.00 pm Friday, August 25th, 1978.

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MAI, via their subsidiary the Basic/Four Corporation, are among the market leaders in the manufacture and supply of small business systems. We have over 5000 systems installed worldwide.

A survey of users of disc-based, real-time mini-computers conducted by Datapro placed Basic/Four unequivocally ahead of the field.

In line with our European expansion we are seeking to recruit Executive Salesmen.

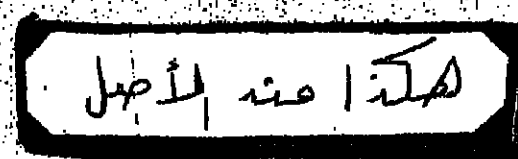
The people we are looking for will be well-versed in commercial applications and have at least 2 years' experience in selling bureau, VRC's or small business systems.

The rewards for the right candidates are:

- 1 Generous basic salary
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You would also have, and be encouraged to exercise, the independence, that we enjoy as an autonomous subsidiary of our international parent company.

Join the team selling the most successful small business systems in the world.



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## Software Professionals

... build an international career with us

Part of Corning Glass Works, a large US multi-national corporation, we are the European Medical Division involved in the development, manufacture and marketing of clinical instruments and diagnostic systems.

### Technical Software Supervisor

This is a challenging post and will ideally suit a self motivated professional with a background in software/communications. You should have at least two years programming experience preferably on IBM software for IBM System 3 or 370 machines.

### Analyst Programmer

You should have at least 2 years experience, including designing, specifying and writing programs for IBM equipment. Experience of COBOL or RPG2 is essential. In addition to the challenge of systems design you will have the opportunity to undertake analysis training. Equipment used for both the above opportunities is IBM System 3/151 (102K), based at Halstead Essex. An attractive salary and benefits package will be offered in addition to opportunities for advancement with our parent company in the UK, Europe and the USA.

For further details and an application form, please contact Brian Murray, Personnel Manager, Corning Medical, Corning Limited, Northern Road, Chilton Industrial Estate, Sudbury, Suffolk CO10 6XD. Tel: Sudbury (07873) 76481.



**JUNIOR PROGRAMMERS**  
£2500 to £4750  
Are you up or less? Move now and get a real challenge in ALL AREAS  
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**ELECTRONIC ENGINEERS**  
£5000 p.a. PLUS  
Degree or HNC in Electronics or related discipline, preferably with experience. To further your career in stimulating environment at international computer group in Central Scotland. For details please dial  
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DON'T BREAK - JUST LISTEN  
(Leave pen and paper ready)

City Office requires an experienced minimum 12 months ICL804 COBOL PROGRAMMER to complete a small team engaged in computerising commodities. Real time programming is essential. Applications Manager in which training will be given if necessary. Salary according to age and experience.  
Please apply to: The Data Processing Manager, C. Carmichael Limited, 85 North Lane, London, EC3, (01) 480 8077 Ext. 230.

## JBA

### Junior Consultants

Berks/USA/Europe  
Opportunities have arisen in the European Systems team of this major American company for Analysts or Analyst/Programmers to join as Project Consultants. They will provide support and advice on commercial projects of all kinds to installations throughout the UK and Europe, and applicants should therefore have a good grounding in commercial applications, preferably with a strong IBM bias. These vacancies have occurred through internal promotions to more senior levels indicating that career prospects are definitely good for able candidates. An ideal opportunity to gain experience of Project Management at Consultancy level. Travel to the USA and Europe, supported by generous tax-free allowances, will play a major part of the job. Contact: Andy Wright

### Analyst/Programmers

London  
Our client, an international computer services organisation has opportunities for staff to join project teams developing commercial systems. Applicants should have a minimum of two years of programming in COBOL, PL/I or RPG2 in a commercial applications environment and have been involved in the design of at least one system. Knowledge of terminal and real-time working would be an advantage. Career prospects to project leader are excellent. Salary according to experience. Large company benefits with chance to travel. Contact: Mike Creamer

### HOLLAND

### Programming Team

up to £12,500  
We have been retained to recruit a team of IBM370 OS/VS1 experienced programmers with a very sound COBOL background and complete familiarity with JCL. The group will comprise a team leader, three junior analysts or Senior programmers, and several junior programmers (with at least 18 months experience). The project applications area will include factory systems, material management, stock control, purchasing and work in progress. Ideal commencement date will be early October and interviews will be held during August in the UK and Holland. Lovely opportunity to experience living and working in Holland whilst earning good salaries. Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

**JAMES BAKER ASSOCIATES, International Personnel Consultants**  
16 Maddox Street, London W1. Tel: 01-491 4478

## ata Computer Recruitment

### HARDWARE APPLICATIONS ENGINEERS

Salary: £1,100 plus CO. CAR + EXPENSES  
MANCHESTER AND HOME COUNTIES

Our client, a major manufacturer of international repute require for the SPECIAL SYSTEMS division experienced Applications Engineers.

The division is responsible for the design of non-standard systems and devices in application areas, such as process control, graphics and telecommunications. This may involve small production rooms of specialised hardware.

The duties of the engineers are:—

- (a) to define the system in conjunction with the clients.
- (b) liaise with the software and design engineering departments.
- (c) to correlate the data and compile the costings.
- (d) prepare customer proposal with detailed product and software descriptions, and
- (e) co-ordinate delivery, installation, and maintain customer contact thereafter.

Applicants ideally should be graduates in electronics engineering or computer science, have in-depth experience of one or more of the following: systems design, hardware design, process control, telecommunications, contract negotiation and project management.

Relocation expenses include all legal fees, estate agent fees, removal costs and subsistence allowances.

For further information telephone Ian Baker on 0272 211035 or contact your nearest ATA office.

ATA COMPUTER RECRUITMENT

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BRISTOL (0272) 211035 EDINBURGH (031) 226 5381 CRAWLEY (0293) 514071

### Systems Analysts

London W1  
A major British engineering and construction company has retained JBA to recruit Systems Analysts to strengthen their financial systems team. All applicants must have worked on financial systems, and for the Senior positions, a minimum of four years relevant experience is expected. The less senior vacancies would commence at salary levels of c. £6,000; Analyst/Programmers looking for a move into full systems analysis should have a minimum of three years D.P. experience. Good salaries and working conditions, plus the attraction of being part of a dynamic environment. Contact: Andy Wright

### Process Control

Bracknell  
A small development group has been established in Bracknell by an international engineering organisation to continue their expansion of the industrial systems market. They have immediate opportunities for mini-computer programmers and specialists to work at all levels on these projects. Applicants must have at least two years experience in industrial or process control applications using mini-computers. A sound background of FORTRAN, CORAL, RTL2 or Assembler is essential. Excellent salaries, relocation expenses and the opportunity for commissioning work in various parts of the world. Contact: Andy Wright

### HOLLAND CAD/CAM Consultant

Salary & terms negotiable  
This senior position will suit a specialist in computer aided design/management wishing to apply his or her experience and knowledge in a consultancy role. The particular skills required are in the areas of interactive graphics applications, numerical control system design, part production systems and design analysis. Dealing with potential customers and assisting the sales and support teams will be the essential part of the job, as well as advising the programming and design teams. The successful candidate will have a proven track record in CAD/CAM type development and sales, be a highly personable and presentable individual with a willingness to travel and deal with people at all levels. European language ability an obvious bonus. Attractive senior staff position offering tremendous scope for creativity, job satisfaction and career development. Contact: Mike Creamer



# A CHANGE IS AS GOOD AS A REST

## PROGRAMMER—COBOL

c£4,500 + benefits

City

Our client requires young COBOL programmers with a minimum of 18 months' programming experience, preferably in the financial sector. Experience on Honeywell equipment or previous use of OS 2000 would be an advantage but isn't necessary. The company offer good fringe benefits for example cheap mortgages, bonus schemes, free lunches and interest free commuting loans. To work with a small team on many varied and interesting projects with flexitime hours. Enquire now.

AOC 1057

## PROGRAMMER—COBOL

c£4,500

London SE1

COBOL programmers required with a minimum of 12 months experience on commercial systems. Successful applicants will be involved in a fast expanding department so promotional prospects are good. The company has an ICL 1901T using EXEC but no previous ICL experience is necessary. For more details phone now.

AOC 1037

## PROGRAMMERS

£4,000 to £6,500

Colchester

Have you had 18 months programming experience in ASSEMBLER — PL1 or related languages and would like to work with Database applications plus gain experience with mini computers? Our client is offering excellent opportunity for people to gain in depth experience of new software techniques and help develop and maintain new computer systems. Applicants should have an IBM programming background. Any experience of TP systems or IBM minis would be an advantage, these requirements assist starting salary but are not completely necessary. For more details enquire now.

AOC 1126

## PROGRAMMERS — BASIC/ASSEMBLER

£neg good

Dagenham

Our client requires programmers with not less than 2 years' BASIC or ASSEMBLER programming. Applicants should be a minimum of 23 years of age and have experience of IBM DOS systems. Successful applicants should expect an increase of their current salary plus benefit schemes from the start employment. More details available, enquire and quote reference number.

AOC 1009

## PROGRAMMERS

c£5,000 + benefits

London SW1

PLAN - FILETAB - COBOL, if you have 2-3 years experience in one or more of the aforementioned languages and would like to work in a small installation on applications with a difference then our clients would be very interested in seeing you. The work location is easily accessible to commuters and the company give interest free season ticket loans to assist. This is a chance to get involved in a small computer department where the work is a lot more interesting and challenging than the normal commercial applications. Any previous experience with George 2 would be definite advantage. The company offer luncheon vouchers and free membership of BUPA. For more details enquire quoting reference number.

AOC 1092

## PROGRAMMER—COBOL

c£4,800 + benefits

Surrey

Required to work in an IBM environment under DOS/VS with POWER. Applicants should have a minimum of 18 months' COBOL programming experience on commercial systems, any knowledge of ASSEMBLER would be an advantage but not essential. The company is currently involved in major redesign and development of all current systems, especially their on-line systems. If you require good job prospects and interesting work also involvement with on-line systems then this position would be of definite interest.

AOC 1045

## PROGRAMMERS — COBOL-PLAN

c£4,500+

Reigate

How would you like to be involved in the setting up of a new installation? Being one of the first in any new installation is good news for the right people. If job satisfaction is what you are looking for in your next assignment then look no further. Our client is offering relocation assistance to successful applicants who have a minimum of 18 months solid COBOL or PLAN programming on ICL machines. The company specialises in integrated accounts systems using their own specially written systems for their many clients, each system being written for individual clients so there is no modification work to existing or bought packages. This surely must be an opportunity not to be missed, enquire now for more details, quoting reference number.

OC 1141

## ANALYST

c£6,000 p.a.

London SW1

Our client is a specialist organisation connected with the engineering industry. They have asked us to find an analyst with 2 years' commercial systems work to become involved with financial systems of a complex and varied nature. The work is interesting and offers opportunity to develop your analysis skills in a stimulating environment.

AOC 1092

## ANALYST

c£6,000 p.a. + benefits

Oxford

We require someone who has designed and implemented at least one major commercial system on IBM or DEC equipment. In addition we need practical experience of PLI programming. The job involves developing new, and extending existing, in-house systems and packages. Information-retrieval systems are currently being developed. Location is on the outskirts of Oxford, a pleasant rural area, and fringe benefits include a subsidised restaurant, free life assurance and flexitime working.

AOC 1108

## SYSTEMS DESIGNERS

c£6,500

Essex

Our client requires systems designers to work on the analysis of new on-line systems. Applicants must have proven experience and have a practical programming experience. A knowledge of on-line systems would be useful in developing the company's expanding remote terminal facilities.

AOC 2140

## CHIEF PROGRAMMER (PL1)

To £7,000 + benefits

Essex

Applicants should have a minimum of 4 years solid PL1 programming experience on financial and commercial systems. To take supervision of a team of programmers, some team leadership experience is necessary and a knowledge of on-line systems, preferably on IBM equipment. This position offers a rare opportunity to a senior person to realise his management capabilities whilst working on a variety of interesting new developments.

AOC 1140

## ANALYST

Kent

Four years experience of programming and design of commercial systems qualifies you for this position. The company is an established ICL user with a sophisticated 1900 installation using driver. Knowledge of on-line systems and experience in insurance or banking would be advantageous. The requirement is for a senior person, who in addition to the normal analyst duties, is capable of arranging client meetings and taking a large measure of responsibility for current projects.

AOC 1094

## Gryphon Computer Recruitment

Essex House Cherrydown Basildon Essex

Contact Chris or Olivia on 0268 282155



GRYPHON

## SYSTEMS PROGRAMMERS

c. £4200

British Aerospace is looking for Systems Programmers to assist with Software Development on two PDP11/45 Processors situated in their flight Development Department.

The job entails analysis of Data, recorded in flight, from sophisticated Military and Civil aircraft. Applicants, of either sex, are expected to be educated to degree standard and to have at least two years' experience in DEC Assembler Language.

Please write, giving brief personal and career information to:

D. Stopford, Personnel Manager,  
British Aerospace Aircraft Group,  
Manchester Division, Woodford,  
Stockport, Cheshire SK7 1QR.

BRITISH AEROSPACE

A 2M byte ICL 2970 running under the VME/B operating system has recently been installed at the Authority's Computer Services Section in central Bradford and, due to internal promotions and new systems developments, the following staff are now required:

### PROGRAMMERS (COMMERCIAL)

REF. RN450

0405-24062 p.a.

Applicants, male and female, should be commercial programmers with at least two years' practical experience in writing COBOL programs. Previous 2900 experience is not essential as training will be available where necessary.

### PROGRAMMER (SOFTWARE)

REF. RN462

0405-24062 p.a.

Applicants, male and female, should have at least two years' COBOL and/or FORTRAN programming experience and although operating system support experience would be an advantage, consideration will be given to applications from programmers wishing to move into the systems programming field. Training in 2900 and VME/B will be provided as necessary. Relocation expenses and disturbance allowances will be paid in approved cases.

For further details and application forms please telephone Leeds 448201 Ext. 276, quoting the appropriate reference number.

Yorkshire Water

## O+M £7,500+ KINGSTON & THE CITY

Not a job for your average 'blinkered' analyst with an inferiority complex about O+M

On the other hand if you call yourself a business systems analyst, speak corporate planning and can talk with an O.R. scientist or systems analyst for the whole coffee break without getting glazed eyeballs then we would like to meet you.

Our company's system developments cannot be locked by a quick and dirty approach. We need a touch of lateral thinking mixed in with a dash of behavioural science and a deep understanding of industrial technology.

We have a large commercial installation with mainframe in insurance. It's a unique opportunity for a systems analyst to work on a way of life.

We don't mind if you're male or female, but we would like you to be motivated, qualified and eager. Write briefly to:

Stewart  
Wrightson



John Cotes Data Processing Manager  
Stewart Wrightson (Services) Ltd  
Essex House, Church Grove  
Kingston upon Thames Surrey KT1 1AG

## Informatix UK & O'seas Index

Phone 01-831 6055

Informatix 24 Gray's Inn Road London WC1X 8HR Telex 299539 HAVEN G

RECRUITMENT CONSULTANTS



POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
SYSTEMS ANALYSTS	c £6,500	INSURANCE	ESSEX	IBM OS	Urgently required - analysts to provide support services for a TP network. 1 yr. experience + DP. Excellent opportunities for the right people.	33/1
ENGINEERING/SCIENTIFIC ANALYST/PROGRAMMER	A1 NEG	BUREAU CONSULTANCY	HOLLAND	MINIS	1 yr. + contract available to scientific/technical people with 3 yrs. experience in an engineering/scientific environment to work on a wide range of interesting projects.	33/2
ANALYST/PROGRAMMER	£6,200	BUREAU	LONDON	IBM OS	Professional DP personnel with knowledge of COBOL and the ability to work on complex systems required to join this established organisation. Graduates considered.	33/3
RPG II PROGRAMMER	c £5,500+	MANUFACTURING CONSULTANCY	LONDON SURREY	IBM syst 3 syst 34	Programmers with 18 months + RPG II experience required to convert/develop a wide variety of commercial applications in a progressive organisation.	33/4
SYSTEMS ANALYSTS	to £6,000	CHEMICAL INDUSTRY	W. LONDON	ANY	First class career opportunities for analysts with 6 months + experience in developing commercial applications in a D.P./TP environment.	33/5
SYSTEMS PROGRAMMERS	c £5,000 + Bonus	SURFACE COATINGS	BERKS	ICL	Excellent openings for COBOL programmer with 2+ yrs. experience and knowledge of George/2003 JCL work in an on-line, technical support environment.	33/6
PL1 PROGRAMMER	To £6,000 +	SOFTWARE HOUSE	LONDON	IBM	PL1 Programmers with 18 months + experience urgently required for a wide variety of applications within this rapidly expanding organisation. Excellent career prospects.	33/7
ANALYST/PROGRAMMER	To £6,000 +	MANUFACTURING	LONDON & MIDLANDS NORTH	VIC + MINIS	Analyst/Programmer with 2 yrs. + experience and some COBOL or Assembler to work on a variety of systems using minis and telecommunications.	33/8
SYSTEMS ANALYSTS	To £6,000	FOOD INDUSTRY	SURREY	IBM OS	Analyst with 1 yr. + experience or in-depth programming experience required to work in this well-established company on data base applications. Promotion opportunities are excellent.	33/9
COBOL PROGRAMMERS/ANALYST/PROGRAMMERS	To £6,000 +	SOFTWARE HOUSE/BUREAU	LONDON E.C.	SURROUGHS	Programmers and Analyst/Programmers with 3 yrs. experience urgently required to work on interesting commercial applications in this stimulating environment.	33/10
TECHNICAL/SCIENTIFIC PROGRAMMER	To £7,000 +	TECHNICAL CONSULTANCY	LONDON S.E.	MINI/MICROS	Varied and exciting development projects available for scientific/technical programmers with 2 yrs. + Assembler/Fortran/COBOL experience.	33/11
SOFTWARE PROGRAMMERS	To £6,000	ELECTRONICS INDUSTRY	S.W. HERTS	ANY	Rare opportunity for the ambitious programmer working on the design, planning implementation and product testing of a wide range of advanced products.	33/12
SYSTEMS PROGRAMMERS	c £6,500 +	PETROCHEM	LONDON W.1 + TRAVEL	MINIS	Two years + experience in assembly language coding and basic programming required. The job involves providing hardware and software support services to remote locations.	33/13
SENIOR ANALYSTS	A1 NEG	CONSUMER PRODUCTS	N.W. LONDON + TRAVEL	IBM/POP	Analysts with 4 yrs. + experience and a degree urgently required to develop interesting commercial projects based on a European network.	33/14
CUSTOMER SUPPORT ANALYSTS	To £6,000 + car allow.	MANUFACTURER	E.C.	SMALL BUSINESS M/C's	Excellent opportunities for analysts with commercial experience to develop/sell systems for clients. Knowledge of RPG II an advantage.	33/15
DESIGNERS/PROGRAMMERS	To £6,000	CHEMICAL COMPANY	MIDDX.	IBM	Excellent opportunity for Analyst/Programmer with a COBOL background and some supervisory experience to work in a DB/TP environment. Excellent career prospects.	33/16
ANALYST	c £6,000	SOFTWARE HOUSE	LONDON W.1	ANY	Excellent opportunities for DP professionals with experience of DB or GRAPHICS or MINIS or INFORMATION RETRIEVAL to work in a stimulating environment.	33/17
PROGRAMMERS & ANALYSTS	To £6,000 +	DISTRIBUTIVE TRADES	SURREY	IBM	IBM COBOL Programmers with 2 yrs. + experience required to work on DB/TP applications in a rapidly expanding organisation.	33/18

## NETHERLANDS

### MINI PROGRAMMERS ANALYST & CONSULTANTS

to £15,000

Our clients, market leaders in systems and software development, with regional headquarters in Holland, are embarking on a further expansion programme for which they require numerous additional personnel. In particular they wish to recruit Mini Software and Applications Specialists, Analysts and Senior Analysts and Consultants with in-depth experience in any of the following areas:

MESSAGE SWITCHING DATA COMMUNICATIONS PROCESS CONTROL COMPUTER NETWORKS  
MINI COMPUTER SOFTWARE

Assembler level programming experience is of primary importance and candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met in full by our clients.

Interviews will be held in London and offers will be made to successful applicants no later than end-September.

33/19



# 'People who work in RPG II should not become nursemaids'

[Altergo Business Systems. 1st Career Principle].

Working on one installation for one user, that's just what happens, right? You put all your skill in and once the system's set up there's not much left to stretch your ability. Time, perhaps, to move to a more demanding situation which never lets up on you: Altergo Business Systems.

We're an autonomous company within Altergo, the most professional software group in this and thirty other countries. We're young, aggressive and talented — established as the specialist leaders in RPG II in a relatively short time — and we're looking for analysts and programmers who think they can match our reputation.

Tedium is one thing that's not part of our career plan for you. For a start you'd be changing project no less than every nine months. Which means a lot of different problems, on constantly varied applications in different industries.

Then there's equipment. We want people experienced on hardware extending from IBM 3234 to system 3 Model 15D and we can promise you the most contemporary hardware available. And finally, your commercial prospects. Leaders we may be, but we've only just started towards our long term aim. Join us and we'll be asking for an enthusiastic commitment to a policy which seeks out and recognises individual achievement. Within the structure, there's no limit to where you can go.

Geographically, you could stay in your general location or travel far and wide. Either way you'll be well paid.

Come and talk to us if you have ambition and you want career scope. Contact Barry Whitesman on 01-734 9681 for interviews in London, Birmingham or Manchester. Or write to him at: Altergo Business Systems Limited, Warwick House, 38 Soho Square, London W1.

altergo

## PROGRAMMERS move into MICROPROCESSING

Have you had any theoretical training in computing or engineering probably at a college or university and offering sound comprehensive training in software for microcomputer systems?

### TIPS TERMINAL SYSTEMS LTD.

Specialise in the development of advanced text processing and control systems for the press printing and broadcasting industries using ZILOG and INTEL microprocessor systems.

To discuss these vacancies ring Ernest Jacobs

01-328 7251

### HALTAM BOROUGH COUNCIL CHIEF FINANCE OFFICER DEPARTMENT COMPUTER SECTION

#### ANALYST/PROGRAMMER

Grade APS/8, £29,500-£30,700

This post offers a challenging and rewarding opportunity to participate in the development of a new ICL 2804 installation due to be commissioned in the Autumn.

Applicants should have a minimum of two years' programming experience in Cobol and/or RPG2 with some system analysis work. A knowledge of ICL 2804 JCL and DOE equipment would be an added bonus.

The above post is based in Winton and a system of flexible working hours is in operation. The Council will be willing to pay reasonable accommodation to the successful applicant, in an appropriate day.

Applications in writing, giving details of age, qualifications, experience, together with the names and addresses of two referees, should be forwarded to the Head of Personnel and Management Services, Halton Borough Council, Municipal Buildings, Kingsway, Winton, Cheshire WA9 7OF. Closing date: 20th August 1978.

R. TURTON, Chief Executive

## Anglian Water Authority MIDDLEWARE MANAGER

£9,645-£10,371  
(including supplement of £312)  
Ref H3D004

The Authority is implementing a regional computer service based on the use of database and data communications techniques. A network of high-speed lines connects the Authority's 19 divisions to the Honeywell dual 66/10 installed at the Computer Centre in Huntingdon.

A Manager is required to head up the Middleware group within the Computer Services Department. This Group is responsible for:

- database administration
- data communications
- technical support
- installation planning

The successful applicant will have a strong technical bias and will have spent at least ten years in data processing, including first-hand experience of implementing database and data communications systems.

The Authority offers excellent conditions of service and generous removal expenses if relocation is necessary.

If you are interested or want to know more about these opportunities, why not call Jenny Spencer at Huntingdon (0480) 58181 Ext. 370 for information and an application form.

The closing date for application is 1st September, 1978, and should be sent to:

ANGLIAN WATER AUTHORITY  
Brook House, Ouse Walk  
Huntingdon, Cambs.

## Science Research Council ROYAL GREENWICH OBSERVATORY PROGRAMMER

There is a vacancy for a Scientific Officer in the Northern Hemisphere Observatory Procurement Team at the RGO. The successful applicant will be expected to take up duty at Herstmonceux and will be required to make frequent visits to the NHO site on the island of La Palma, Canary Islands which is approximately 8000ft. above sea level. The vacancy is permanent and pensionable.

### DUTIES

1. In the RGO as a member of the NHO Project Team, to work in the NHO Computer Department on providing software to collect and analyse data from astronomical detectors using computers; including liaison with electronics engineers and other members of the NHO Division.
2. At the site to commission complete systems, to instruct visitors and staff where necessary and to assist in fault finding.

### QUALIFICATIONS AND EXPERIENCE

Applicants should preferably have a good Honours degree with significant computer systems content, or have an equivalent standard of knowledge, training or experience. Experience of Fortran is desirable but training will be given if necessary. A good background in Mathematics would be an advantage.

**SALARY** scale £2,839-£4,415. Starting salary according to qualifications and experience.

**APPLICATION** forms and further information can be obtained from Mr. N. Jones, Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex BN27 1RP; telephone Herstmonceux (032-181) 3171 Ext. 206 and should be returned not later than 15 September 1978.

## OPERATORS

TOTAL EARNINGS  
TO £4,500+

Experienced operators are required by a Stockbroking firm with an installation at Chingford, London, E.4. The hardware involves an IBM 370/125 using DOS POWER/VS with both local and remote teleprocessing facilities.

Contact: J. Harskovic 01-624 1925  
Laing & Cruickshank  
15 Hall Lane  
Chingford  
London, E.4

## Sutton, Surrey

The Crown Agents operate as financial, professional and commercial agents for about a hundred foreign governments and many more overseas public authorities and international organisations.

The Computer Division is located at Sutton in Surrey and a Honeywell Level 66/05 has recently been delivered to replace the H 1250 and H 1015 already installed.

## Systems Analyst Up to £6,250

There is an immediate vacancy for a Systems Analyst to join an established team working on advanced systems for the banking and investment departments using on-line and data base techniques. Qualifications required are at least five years' data processing experience including systems design and implementation.

MH/721/CD

## Analyst/Programmer Up to £5,400

An Analyst/Programmer is required to work on advanced data processing systems using Honeywell I/O and TDS software. Applicants should have at least three years' programming experience and a knowledge of Level 66 GCOS would be an advantage.

MH/722/CD

For further details and application form please telephone Miss Horne (01) 222 7730 ext. 3362, or write, quoting the appropriate reference.

## Crown Agents

The Crown Agents for Oversea Governments and Administrations, Recruitment Division,  
4 Millbank, London SW1P 3JD.

## CHIEF PROGRAMMER

UP TO £7,000

This country's leading Party Plan Fashion group seek an experienced person to fill this important role. The computer department provides a service to the production, accounts, sales, merchandise and customer liaison departments.

Digital and N.C.R. computers are in current use, supporting 30+ terminals on-line within the company, as well as a batch processing service.

The successful applicant will supervise and schedule programming within the department and be responsible for continuing the programming standards and disciplines. Applicants should have a sound educational background, experience of over four years in programming and a detailed knowledge of NEAT/3 or MUMPS.

A salary of up to £7,000 p.a., with assistance or relocation, if applicable, is being offered.

For further details of this position, contact:  
J. G. Duncan, D.P.M.  
PIPPA DEE PARTIES LTD  
Anglesey Road, Burton-on-Trent, Staffs  
Tel: 66344

## COURSES

### COURSES AT HARWELL EDUCATION CENTRE

#### MATHEMATICAL METHODS FOR COMPUTING A SERIES OF SIX COURSES

1. Elementary Numerical Techniques  
18 to 19 October 1978
2. Numerical Calculations with Matrices  
29 to 30 November 1978
3. Optimization & Non-Linear Least Squares  
Calculations 8 to 10 January 1979
4. Data Fitting & Approximation  
10 to 21 February 1979
5. Numerical Solution of Ordinary Differential Equations 8 to 11 April 1979
6. Partial Differential Equations  
21 to 22 May 1979

#### OTHER COURSES

PC/1 for Fortran Programmers  
13 to 17 November 1978  
Introduction to the Use of Small Computers  
14 to 17 November 1978

Apply to: Harwell Education Centre  
A.E.R.E. Harwell  
Didcot, Oxon OX11 0QJ  
Tel: 0295 424141 ext. 2468

## SALES COMPUTER PERFORMANCE PRODUCTS U.K. AND EUROPE

COMTEN is a well-established computer performance measurement products firm based in the United States with offices worldwide. We are presently seeking to expand our London based office with the addition of an aggressive, self-motivated sales person.

Applicants should be able to demonstrate a successful record in sales. Experience of computer systems is essential.

The remuneration package will include a starting salary of £6000-£7000 depending upon experience, commission potential in excess of 25% of salary and company car.

Please write, giving career résumé, to:  
Max Mahanke, General Manager  
COMTEN (Performance Systems) U.K. Ltd.  
23/24 Great James Street, London WC1N 3ES

COMTEN  
(PERFORMANCE SYSTEMS) U.K. LTD.

## COMPUTER ENGINEERS U.K. — O.S.

Field/Site/Support  
All systems go  
£4,500-£14,000 p.a.  
★ stand by  
★ shift  
★ overtime  
(according to post)  
car or allowance  
E. B. STADOK ASSOCIATES  
Recruitment Consultants  
Hoddeston (08824) 42728

## UNIVERSITY OF EDINBURGH DEPARTMENT OF INTELLIGENCE RESEARCH ASSOCIATE (SYSTEMS/ APPLICATIONS PROGRAMMER)

A Research Associate (systems/applications programmer) is required to join a research team which is developing a new system for the analysis of intelligence data.

Duties will include implementing a new system on a DEC VAX-11/780 computer, and writing applications software for use by the research team.

The post is available from 1st September 1978. Salary will be at an appropriate point on the 18 scale £3,000-£4,001, according to age, qualifications and experience.

Further particulars may be obtained from Dr. Peter Macdonald, Director of the Department of Intelligence Research, University of Edinburgh, 100 George Square, Edinburgh EH8 8JL, with whom applications should be made, enclosing a curriculum vitae and two references.

Two references should be lodged not later than 31st August 1978. Please quote reference 5042.

## SCIENTIFIC PROGRAMMERS COMPUTER OPERATORS

Vacancies exist within our data processing division for Scientific Programmers and Computer Operators with some experience and an interest in

## OIL EXPLORATION

Experience in Seismic Processing and/or Mini Computers a definite advantage. Our offices are in Swanley, Kent, adjacent to the Swanley main-line station which is 25 minutes from Victoria.

**PROGRAMMERS.** Minimum qualifications are either a science-based degree or good 'A' levels in Maths or Physics, combined with some previous FORTRAN programming experience. Salary negotiable up to £4536 per annum according to experience.

**OPERATORS.** Candidates, though based in Swanley, will be required to work at an installation in London on a semi-permanent basis. Salary negotiable from minimum £2943 plus 20% of basic salary as shift allowance. Shift systems vary according to location but cover a 7-day/24-hour operation.

Write or phone for an application form to:  
P. A. Turnbull, Personnel Supervisor, S and A House, Azalee Drive, Swanley, Kent BR8 8JR. Tel: No. Swanley 68011.

(A member of the English-China Clays Group of Companies)

## THE SALES BIT

## Finding where the buck stops

THE salesman can't always get it right. There is bound to be a situation somewhere along the line when, despite taking all the basic selling precautions, he suddenly discovers that the person he believed to be the decision maker has to go to some other source for final approval. This might involve a parent company board, a select committee, a direct superior or even a union.

This type of situation calls for swift action, objectivity and boldness on the part of the salesman. He must endeavour to make direct contact with the decision maker, and only a straight question can make it happen. "Who is the final decision maker? Can you contact him and see if it is convenient for us to meet briefly while I'm here?"

If the response is negative then: "Will it be easier for you to arrange an appointment for me now, or shall I contact his secretary on the way out?"

A covering letter should accompany each individual copy, perhaps indicating the date of the appropriate board meeting, and certainly referring to the "benefits" section.

This is essentially an unsatisfactory sales situation, but one where handing over a bunch of technical leaflets for onward transmission will not suffice. What makes it even more unsatisfactory is that it would never have occurred if the salesman had got his pre-approach analysis right or even asked the most important question of the first sales call: "Who makes the decisions around here?"

The salesman has to view the situation through the eyes of the newly revealed decision maker(s). One thing for sure, no decision is going to be made in favour of his product unless those involved know what they are expected to decide upon and why. This is where the formal sales proposal comes into its own.

TRADER

## BOOK REVIEW

## Reading for Basic understanding

Illustrating Basic, by D. Alcock. £1.99. Cambridge University Press. The Basic Idea, by R. Forsyth. £1.95. Chapman and Hall.

ALTHOUGH both of these introductory books are written for students without any prior knowledge of computing, the approaches they follow are diametrically opposed.

While both authors acknowledge the lack of standardisation in Basic, Alcock accordingly treats the "need for portability as an axiom" and describes the language so that programs may be written without dependence on any particular version of Basic.

Forsyth adopts the policy of sticking to one representative implementation of Basic, namely Digital Equipment's. This later approach severely limits the utility of the book.

To be fair, Forsyth does give students some guide lines to be followed when portability is required, but these occur almost as an afterthought in the last chapter and occupy less than half a page.

On the other hand, some students may find Alcock confusing in that he often enumerates several possibilities in describing

CORNELIA BOLDYREFF

### Puzzle answer

THE formula is: Constant =  $\frac{1}{2}(n^2 + n)$ , so the constant for a 10 x 16 square is 205.



# A move to Southampton offers Computer Staff more than just a change of address.

Southampton City — Right at the Centre of Things — Ideally situated close to South Coast Resorts. Easy access to the New Forest and the West Country. Superb sporting and leisure facilities. A fine shopping centre. Just a few of the benefits a move to Southampton could bring Computer People who want more out of life than just job satisfaction.

Southampton City Council has a number of vacancies in its Computer Division for suitably skilled staff. Employment benefits include —

● Subsidised Canteen ● Staff Social Club ● Job Security, and dependent upon circumstances.

£500 removal and resettlement allowances  
£10 per week lodging expenses (up to six months)  
Temporary housing accommodation.

Immediate vacancies within the Division include

## SYSTEMS ANALYST/PROGRAMMERS

Workload in the Division has created an urgent need for people with varying degrees of practical experience of DOS/VS and who have a knowledge of COBOL. Preference will be given to those with formal qualification. Salaries are negotiable up to £5,073 p.a. according to experience. Working hours are flexible.

## COMPUTER OPERATOR

An operator experienced in the operation of the IBM 370 using DOS/VS is required. The successful person will join a skilled team and should be prepared to work alternative shifts over a five-day week with overtime working to meet peak loads. Salary up to £3,651 p.a. plus shift allowance of 14%.

Our hardware comprises an IBM 370/125/2 with 3340/44 Disc System and mag. tape; a Burroughs B80 Mini for cash receipting and a Redifon Seecheck System for Data Entry.

For further details and application form contact the City Treasurer, Civic Centre, Southampton SO9 4XD. Tel: Southampton 23855, Ext. 498.

(Closing date for applications is 30th August.)



# Southampton City

Southampton City Council

## ANALYST/PROGRAMMER FOR DP AUDIT

Midx. Between £5133-£6012

The DP Audit Section of Eastern Gas at Enfield require an Analyst/Programmer who will be involved in the independent appraisal of the Region's computer based systems. Reporting to the Assistant Audit Manager (DP), your work will involve the writing of TABN/PTLA and COBOL programs as an aid to the review of the Region's systems, and you will be expected to liaise both with Management Services and the other Audit functions with regard to controls over systems and the computer hardware/software. The ability to communicate with all levels of management is therefore of utmost importance.

The installation currently comprises three ICL 1600 mainframes which are scheduled for replacement by dual 2872s. This conversion is being closely monitored by DP Audit and is an example of the wide range of activities undertaken by the section.

The salary range will be £5133-£6012 according to your experience.

For further details of this excellent career opportunity in a major Region of today's go-ahead energy industry, please telephone or write for an application form to: Senior Recruitment Officer, Eastern Gas, Star House, Milton Lane, Potters Bar, Herts EN6 2PD. Telephone Potters Bar 51151 ext. 502.

EASTERN GAS

## Computer Operations

KING'S LYNN £4500+

Dow Chemical is one of the world's leading chemical manufacturers with an exceptional record for growth and profitability. The Computer Services Group of the U.K. Company is located at King's Lynn together with a number of other major functions.

We are looking for a computer professional to assume responsibility for our computer and data entry operations. We have an IBM System 3 model 12 for batch applications with remote job entry to a mainframe in Switzerland. The equipment is primarily operated during normal office hours. As part of our development plans for interactive applications, we will be installing a PDP-11/70 with VDU terminals at various locations in the U.K. This and other developments will provide a real career opportunity for someone with at least three years' experience of computer operations, wishing to get involved in the assessment of our long term application requirements. The successful candidate will be expected to work with the minimum of supervision in a progressive informal working environment.

Starting salary will be around £4500 but could be more for an exceptional candidate. We offer a range of fringe benefits including pension, share purchase and BUPA schemes and generous relocation expenses where appropriate.

Interested? Then telephone

Alan Popham, Personnel Manager  
Dow Chemical Company Ltd.  
King's Lynn, Norfolk  
Telephone 01223 for an application form

DOW

## COMMUNICATIONS SYSTEMS

### Sales Engineers

#### WESTERN HOME COUNTIES

Our client is a member of a multinational corporation and is engaged in the development of communications systems for a variety of applications. Sales engineers are required for the marketing of these systems in the UK and overseas in both Domestic and Commercial markets.

Applicants should have experience in one or more of the following areas:

- UK Sales of telegraph equipment, multiplexers, VDUs or computer systems
- Distance or overseas marketing of communications products
- Systems engineering in message switching or related fields

In-house training will be given where appropriate. Company benefits are excellent and include a company car and generous relocation assistance where appropriate. Please write in strict confidence quoting ref. DT/248 to Brian Withers.

**GRS**

Gerrard Recruitment Service,  
10 Argyle Street, London W1V 2BQ.

## COMPUTER PERSONNEL APPOINTMENTS LTD.

Career Specialists and Consultants for:  
**D.P. MANAGERS, SYSTEMS ANALYSTS, PROGRAMMERS AND OPERATORS**

Midlands, Northern Counties and Scotland  
For application forms apply to:  
65 New Street, Birmingham B2 4DU. 021-643 0851 or Tel 01: 723 5334

## Wrangler

### SYSTEMS ANALYST/PROGRAMMER

Wrangler, one of the world's leading manufacturers of leisure wear, want to offer an interesting job to an enthusiastic professional who has at least 1-2 years' systems and programming experience in a commercial environment. You must have a knowledge of Cobol or RPG and any experience of on-line systems could be a possible advantage.

You will join a small EDP team at our Head Office and Distribution Centre in Calverton and have the opportunity to become very involved in the activities of the site. The Company has an IBM System 3 and knowledge of this hardware would be useful. Men or women interested in this position should telephone or write for an application form to

Mr. Alan J. Osborn, Personnel Manager  
BLUE BELL APPAREL LIMITED  
Calverton, Nottingham  
Tel: Woodborough 3088

## Lothian Health Board

A Great Community Service

### SENIOR SYSTEMS DESIGNER

Scale 14 — (£5,637-£6,715 per annum)

A vacancy has arisen in the Computer Services Unit for an experienced Senior Systems Designer to work within the Health Service on behalf of the Computer Consortium of the Lothian, Fife and Borders Health Boards.

The post involves responsibility as project leader for a small team of designers and programmers working mainly on medical applications. Opportunities will be provided to work on financial and other application areas where appropriate.

The unit has ICL 1903T, 7502 and CMC 5200 equipment and there are off-line links to other sites.

Candidates should have considerable experience in computing and a proven ability to design and install complex systems. A relevant professional or academic qualification is desirable and knowledge and experience of computing in the Health Service would be an added advantage.

Further details and application forms can be obtained from the Personnel Officer, 11 Drumshugh Gardens, Edinburgh EH9 7QD, to whom completed applications should be returned by 1st September, 1978. Please quote reference LHB/0278

## Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth  
**Block 11 (Physical Block)**

Hex and Zap are still up in the mountains awaiting Cleo and Lambda, unaware of their plight; and now Ascii has disappeared.

"ASCII's gone!" Hex's shout woke Zap.

"Cool it, will you?" snorted Zap.

"But we're in trouble. We've got to do something."

"We always were. What do you suggest?"

"We'll have to go and find him."

"How?"

"By radar."

"You mean he won't maintain radio silence? Then we're better off without him," stormed Zap. "He'll lead the whole pack onto us."

Hex was infuriated by Zap's defeatist attitude. There were times when he clearly regretted leaving the security and locality of the System to work alongside a bunch of crackpots. However on this occasion Hex had to admit he had a point.

"We could follow his tread marks," ventured Hex lamely.

"And what happens when Cleo and Lambda arrive to find us gone?"

The exchange had gone badly for Hex, and he knew it. He took stock. His one really dependable ally was lost. The two girls were probably in dire straits, perhaps even in the hands of the Error Squad. Zap was subject to bouts of cantankerousness, and apparently believed that with their limited resources they could hope to achieve little more than a token Kamikaze mission. On top of this, they had neither offensive nor defensive weapons; and needless to say had yet to decide on a strategy. The outlook was undeniably bleak.

At that moment a small lump of earth, dislodged higher up the tunnel, rolled down and hit Hex in the back. He sprang up like a startled deer. From beyond their view came the sound of footfalls.

"Anyone at home?" echoed a tentative greeting.

Hex recognised Cleo's voice. His feelings were too strong and too mixed even to experience without perplexity, let alone to express. It was left to Zap to answer the call.

Shortly afterwards Ascii entered. Cleo followed, limping and supported by her sister.

"Sorry we're a bit late," said Cleo.

"Ascii scented us," added Lambda. "He came down to help us with the final ascent."



Hex could see that Cleo's knees were covered by two discs of caked blood, but her spirit was undimmed.

"I could do with a bath," she proclaimed. Hex led her, hobbling, down to the pool in the centre of the crater. She dipped a toe in the water. Immediately she recoiled. "It's hot!" she exclaimed. "It was freezing last time."

Hex immersed one finger, then his right hand. It was distinctly warmer than the previous morning when it had been lukewarm.

"We've got a warm spring," he replied. "I noticed it yesterday, but today it's a bit hotter. It could be medicinal. Go on, take the plunge!"

Before she could reply, Zap and Lambda had joined them, bent on horseplay, and moments later all four were splashing around in their private heated swimming pool like children, with Ascii barking excitedly on the water's edge.

After their dip, they made plans. As night fell they were engaged in deciding how to strike their first real blow against the Network. Hex favoured adapting Dr Null's concept and equipping Ascii as a gigotic de-stabilizer, to exploit the System's vulnerability to gigotic induction; but Zap had his own ideas.

"What do you know about gigotic processes?" began Hex.

"We had a lecture from Igor Gigotski himself in my first year at Brainstorm College," replied Zap. "He told us about the standard counter-measures."

"But Gigotski perished in Russia forty years ago."

"Well, he looked in good shape to me."

This not only undermined Hex's fundamental premise, it eroded his faith in Dr Null's last confession. While he tried to reconcile it with what he knew, Zap got into his main theme.

"The only way to blow the System's collective mind is with LSD."

It sounded like a blast from the past. "With what?", Hex queried.

"LSD — Large Scale Disintegration. I've thought it all out. The System depends on the integration of astronomical numbers of incredibly tiny components, all based on wafer-thin slices of a silicon substrate. It is literally built

on sand. Dissolve that, and you break up the System."

"A hardware solution?" was Hex's reaction. It didn't appeal to him.

"The hardware they come, the hardware they fall," said Zap, misquoting Dr Null.

"But what do we dissolve it in?"

"The most powerful solvent known to the mind — Leibnizian Sylogistic Acid, the only substance that can be transmitted along wires in monadic form and re-materialised by a signal pulse."

"Don't blind us with science," commented Hex. "You're saying you're going to drug the entire System."

"Like they've never been zapped before."

"Can we make this stuff?" asked Lambda.

"We don't need to," stated Cleo, before Zap could reply.

They turned to look at her. When she had their undivided attention, she continued. "There's a vat of it at Sprocket's Hole. They used to press mushrooms and ferment the juice using their own special recipe. I think that's what got them banished in the first place."

"Right, that's settled," concluded Zap. "We get down there and pump it into the Network's arteries. Let's have a show of hands."

Only Hex's arm did not rise. In vain, he tried to persuade them that the effects would not spread fast enough and could be localised, unlike a gigotic field. Their minds were made up.

"Now all we need do," said Zap, "is pick a name for ourselves to go down in history. How about The Circuit Breakers?"

Cleo suggested 'the human rights movement' but got no support. After some disputation Hex proposed 'the gang of 415'.

"I see," said Cleo. "four people and a dog."

"No," chorused the three androids in unison, "four automata and a human," and burst into laughter.

The insult hurt Cleo deeply. The atmosphere became suddenly charged. In the semi-dark cave Hex reached out and put a hand round her shoulders to comfort her. Before he knew it, he was kissing her full on the mouth.

Could this be the start of something? Yes.

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